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Brass Manufacture in a Modern Plant

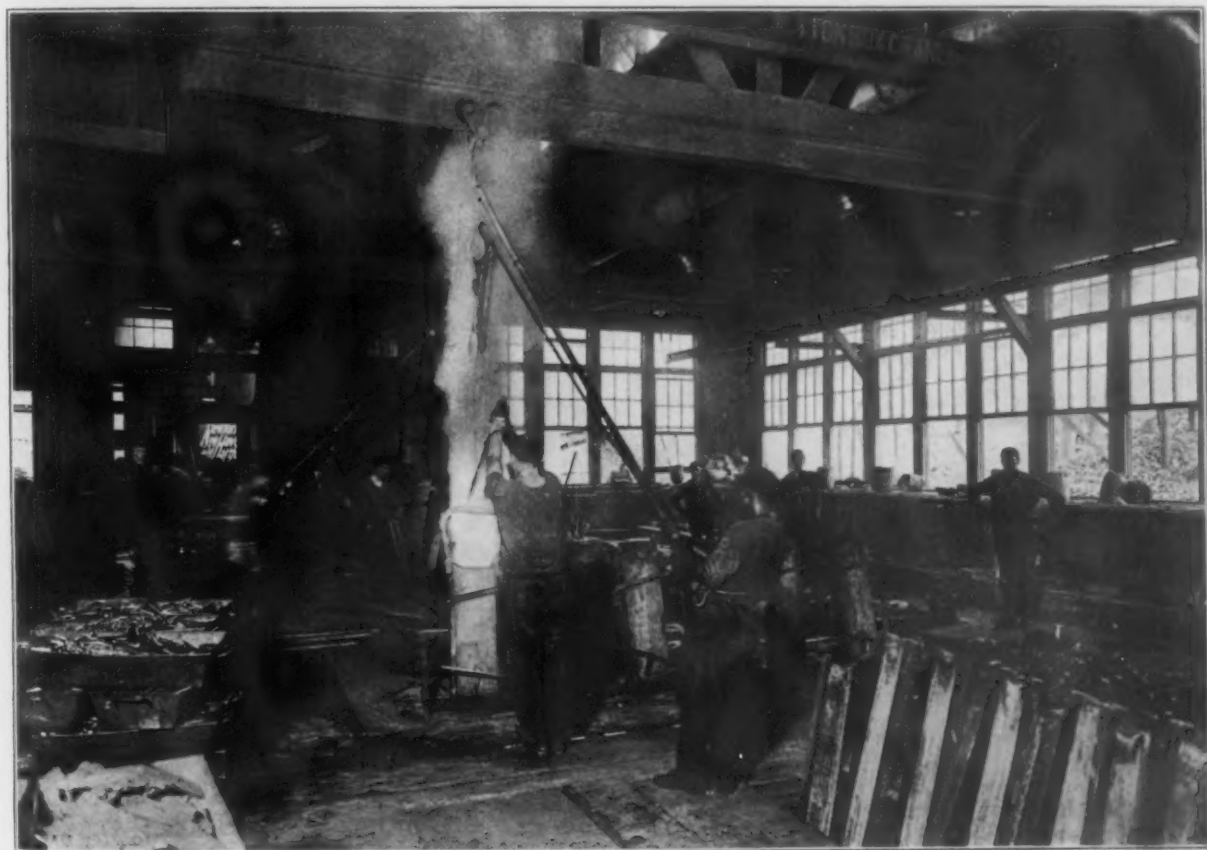
Expansion of the Brass Industry in the Past Two Years, as Illustrated by the Stamford Rolling Mills Company

BY W. E. FREELAND

EVEN in these days of startling industrial growth it is not usual to find a business expanding from 30 hands to over 1250 in a little more than a year. Yet that is the story of the Stamford Rolling Mills Company, Stamford, Conn., from August, 1915, to February, 1917. It is perhaps unnecessary to state that the group of men respon-

of metal a month. Since that time the plant has been greatly extended and now has 7 stands of rolls and 108 fires in operation.

In the fall of 1915 the American Cupro-Nickel Company started an entirely new plant on Fairfield Avenue in Stamford. Before this plant was completed the Stamford Rolling Mills Company took



The caster manipulates the crucible with large special tongs. An iron pipe attached to the trolley and equipped with a curved end to fit the arm or body enables the helper to handle the crane much more rapidly and accurately than would be possible with the ropes alone.

sible for this rapid growth had high ideals combined with scientific thoroughness and were peculiarly free from the limitations of tradition and precedent in the brass business.

In August, 1915, the Stamford Rolling Mills Company, a new organization, took over the plant of the United German Silver Company at Springdale, Conn., a suburb of Stamford. At that time the plant consisted of a small group of buildings with two stands of rolls and 18 fires and produced 200,000 lb.

over the entire capital stock and immediately began making large additions. This plant, which is called the No. 2 mill, now has 14 stands of rolls and 96 fires. The Springdale plant is especially equipped to make German silver, sheet and strip brass and copper; the Stamford plant to make cupro-nickel and thin gage brass. The total production of the two mills is over 4,000,000 lb. a month.

The Springdale mill is located on the New Canaan branch of the New York, New Haven &



After the bars have been cast and cooled they are taken to an alligator shear where the gates are cut off and the bar cut in two. An industrial car carries the bars to the storage yard where the metal is stored as shown until the mill is ready to receive it. The bars are weighed into the mill in 50-bar lots.

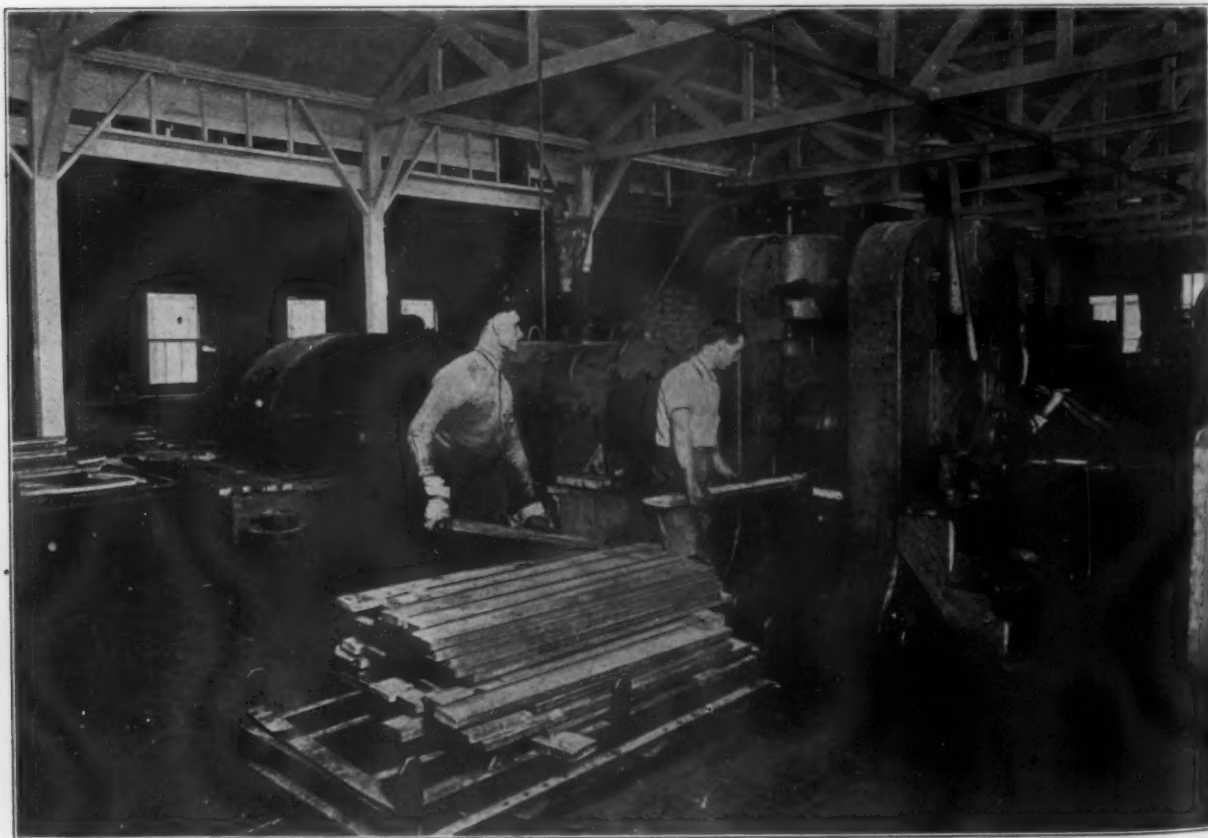
Hartford Railroad. It has an extensive spur track installation so that the metal and other heavy materials are easily handled directly into the plant. At this plant is a cabbaging building, storehouse, bonded warehouse, three casting shops, rolling mill, recovery plant, smelter building, pump house, sand-blast house, boiler house, transformer house, restaurant, garage and guard building, fire apparatus and other buildings necessary to make a modern and complete rolling mill. The executive offices are located at this mill. A network of industrial tracks serves practically all the various buildings and plays an important part in the transportation of the heavy loads incidental to the industry. The company has

also under way another large building which will be used as a hot copper department. A complete equipment, including three hot copper mills has been ordered for this building.

In the cabbaging building, the brass scrap is compressed by a special type of hydraulic press, called a cabbaging machine, into rectangular bales of about 6 x 6 x 14 in., which are of an average weight of 35 lb. This compression aids in the handling of the loose metal and puts it into convenient form for insertion in the crucibles. The storage building is used for general storage and materials are unloaded directly from the cars. Metals are stored in the next building, called the metal room, which has large bins for the different kinds of metals. In this building is installed a large alligator shear for cutting scrap and bars. Here all the metal for the casting shops is weighed and placed in pans holding approximately 210 lb., each pan containing the charge for one crucible.

Between the metal room and the casting shops is a large space given over to storage of coal and coke. The coal is dumped into a hopper under the spur track. From this hopper an elevator of the continuous bucket type lifts the coal 50 ft. and delivers it automatically into a chute which extends over the length of the storage space. At convenient intervals in this chute are gates which deflect the coal to any desired storage pile. Hard coal, coke and charcoal are used.

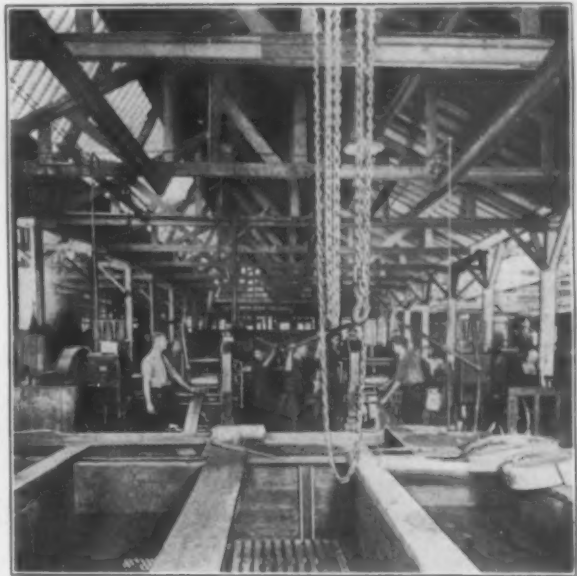
As the car of metal from the metal room enters the casting shops, it runs over track scales, which serve to check the weights as determined in the metal room. Along one side of each casting shop is a row of coal bunkers. In front of the bunkers is a row of fires in holes, 15 in. square, lined with fire brick. The crucibles are set in these holes in direct contact with the burning fuel. Running down through the center of the shops are pits in which are placed in a vertical position the molds in which the bars are cast. In one of the shops are 24



The breaking-down mill has 20 x 24-in. water-cooled rolls and is driven by a 250-hp. motor through herringbone gears which serve to eliminate the chatter marks sometimes caused by spur gears.

fires; in the other two, 36 and 48 fires, respectively. One stack serves the smallest shop, a larger stack situated between them serving the other two shops. The crucibles, on being lifted from the fires, are conveyed to the pouring position by hand-operated cranes of the I-beam trolley type, which have a range extending from the fires to the mold pits. A length of iron pipe with an end portion curved to fit the body or arm of the operator plays a part in the manipulation of this crane. With the rope control in his hands and the iron pipe against his body, the operator is enabled to move the crane or trolley rapidly to any desired position.

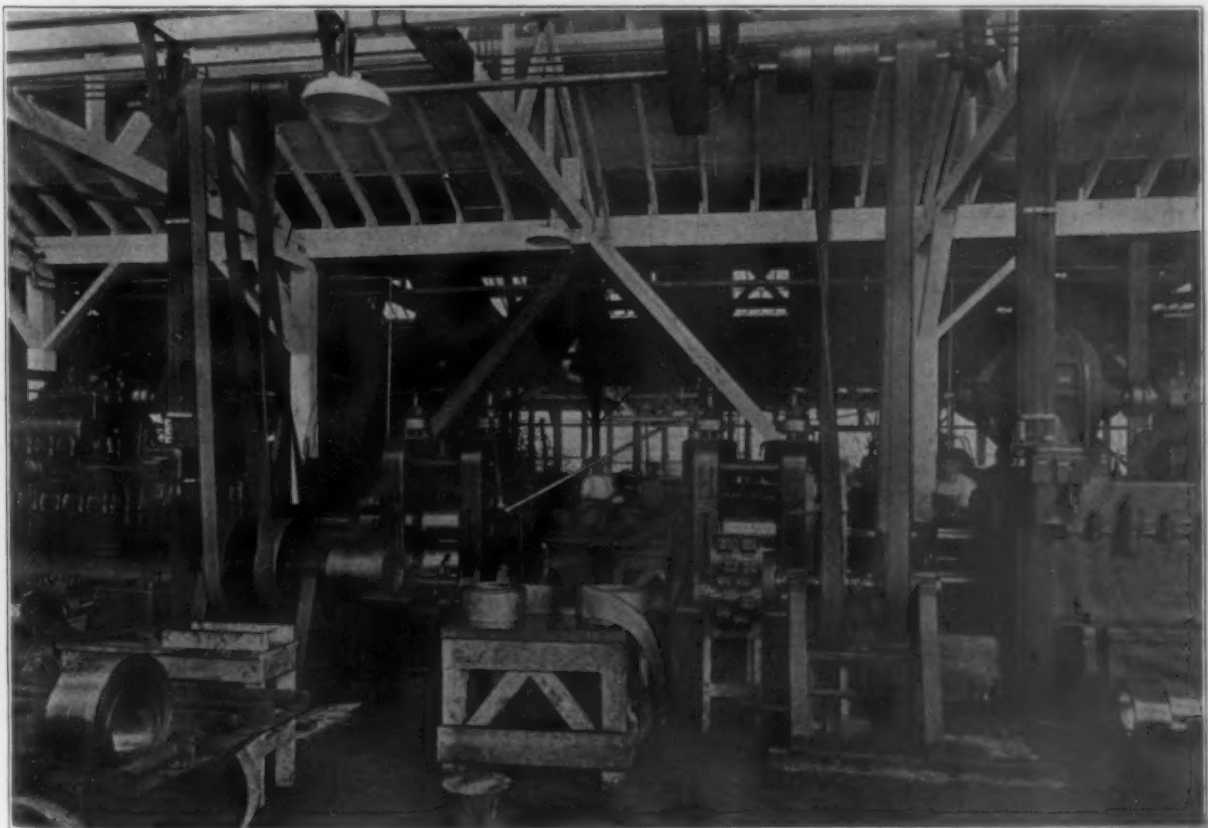
The position of caster in a brass shop has always been held one of honor. In the olden days each caster was valued because of the peculiar secrets which he was supposed to possess and which he took with him from plant to plant as his personal stock in trade. To-day science has lessened the importance of the personal element in the casting room. It is still true, though, that the caster is, and must be, a man of peculiar skill in his calling. His is a trade in which nothing has yet been found to supplant years of training and a large measure of personal experience. It is interesting to note the dexterity with which he handles the 200-lb. crucible and to learn that he determines the speed of pouring by the tone of the hissing sound produced by the burning of the oil with which the interior of the mold is coated. Other little tricks that he employs would pass unnoticed by the uninitiated; such as placing a block of soft wood on top of the hot metal in the crucible while pouring, so that the flames of the burning wood will help to lessen the oxidation of the surface of the molten metal; or his method of telling when the molten charge is at the proper pouring temperature by feeling the number of vibrations transmitted to the stirring rod which he rests on the bottom of the crucible for an instant after stirring the metal; or the clever way in which he uses his skimmer-rod to separate the flow from



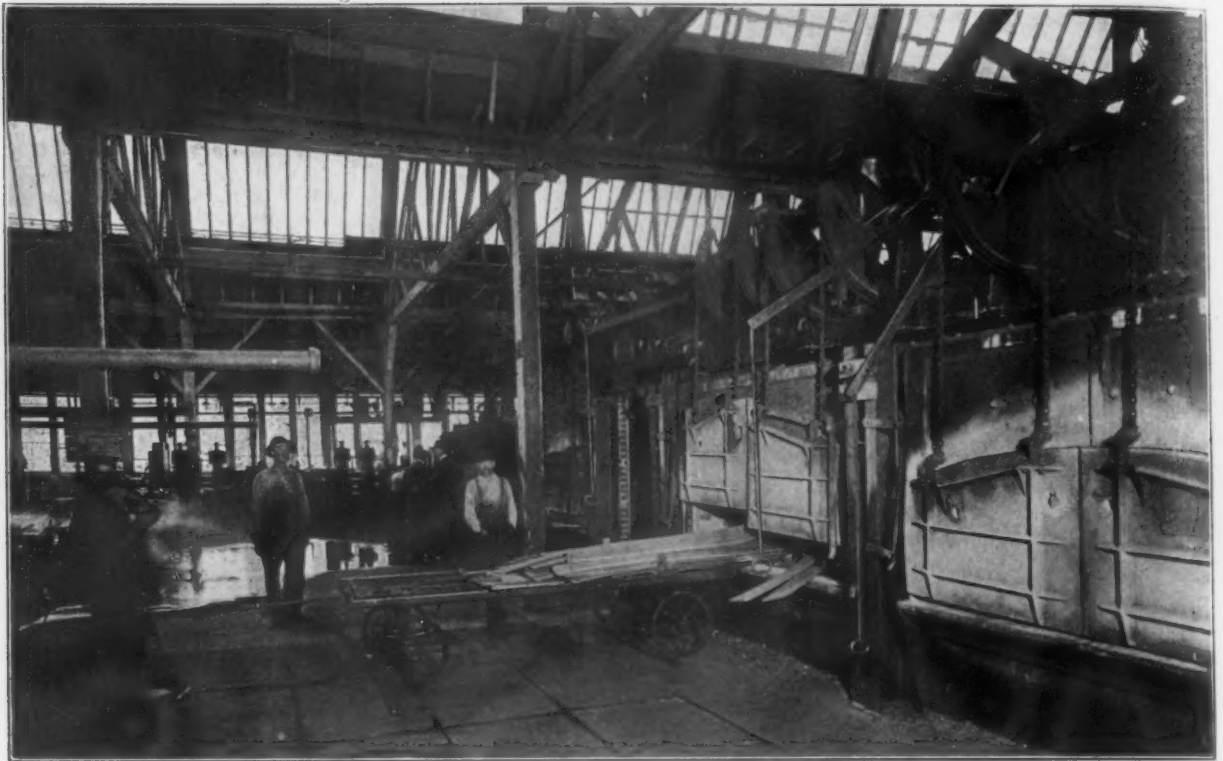
The sticking side of two stands of 10-in. finishing rolls. After passing through the pickle bath, the coils of brass are left under water to prevent oxidation until the roller is ready for them. On the further side of the mills is an automatic blocker which re-rolls the strip of metal.

the crucible into two streams which makes better bars than single stream pouring where no strainer-cap is used. A strainer-cap is usually placed over the top of the mold, particularly on the larger sizes, as its use produces a more perfect cast bar. These strainer-caps have several holes of about $\frac{3}{8}$ in. diameter, the number and location of these holes varying according to the size of the mold.

The cleaning of the molds is an essential part of successful brass casting. A special type of industrial car upon which the molds are supported in a vertical position is used to transport the molds to a special blast building. The inner surfaces of the molds are cleaned with a blast of crushed steel shot



Each finishing mill is driven by a 75-hp. motor superimposed on the gear casings. In locating the stands the roll ends are placed adjacent in each pair so that one roller can supervise two sets of rolls.



The annealing furnaces in both mills are of the oil under-fired muffle type with beds 30 ft. long. The strips of metal are loaded on muffle pans—long sheets of iron—and are pulled into the furnace from the charging side and pulled out as shown by iron hooks attached to chains wound up by a motor-driven winch. The mill trucks used have roller beds to facilitate the handling of the muffle pans.

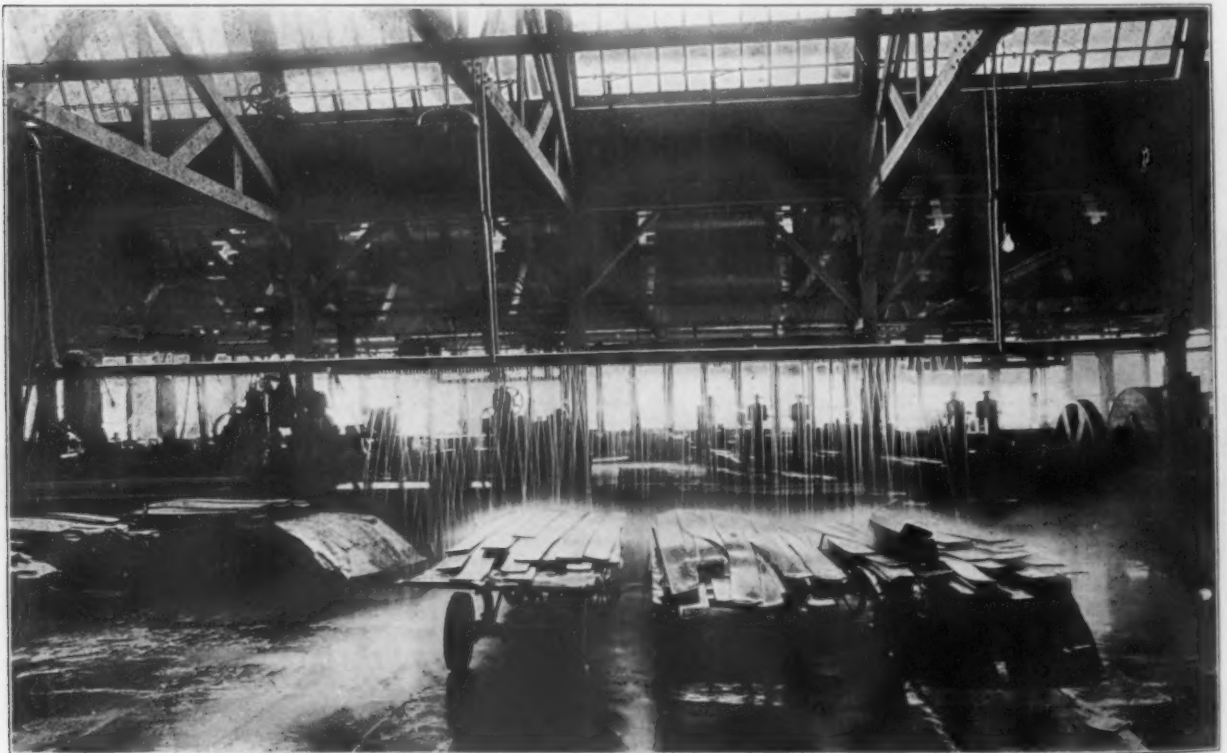
which has been found more successful than the sand formerly employed. After the shot blast, the dust and dirt are removed by an air blast and the molds are again ready for use. The same molds are not used for brass and German silver, a special set of molds being used for German silver casting.

The foreman of the casting shop at No. 1 mill is Frank P. Welton, who has been for many years a recognized expert in the manufacture of German silver. Mr. Welton entered the casting shop 35 years ago and has had an experience of 26 years as

foreman and superintendent. For 22 years he was with the Benedict & Burnham branch of the American Brass Company, Waterbury, Conn., and was one of the organizers of the Waterbury Rolling Mills.

The Rolling Mill and Its Equipment

After the bars are cast and cooled, they are loaded upon an industrial car and carried to one of several large alligator shears, located at convenient places in the casting shops, where the gates are cut



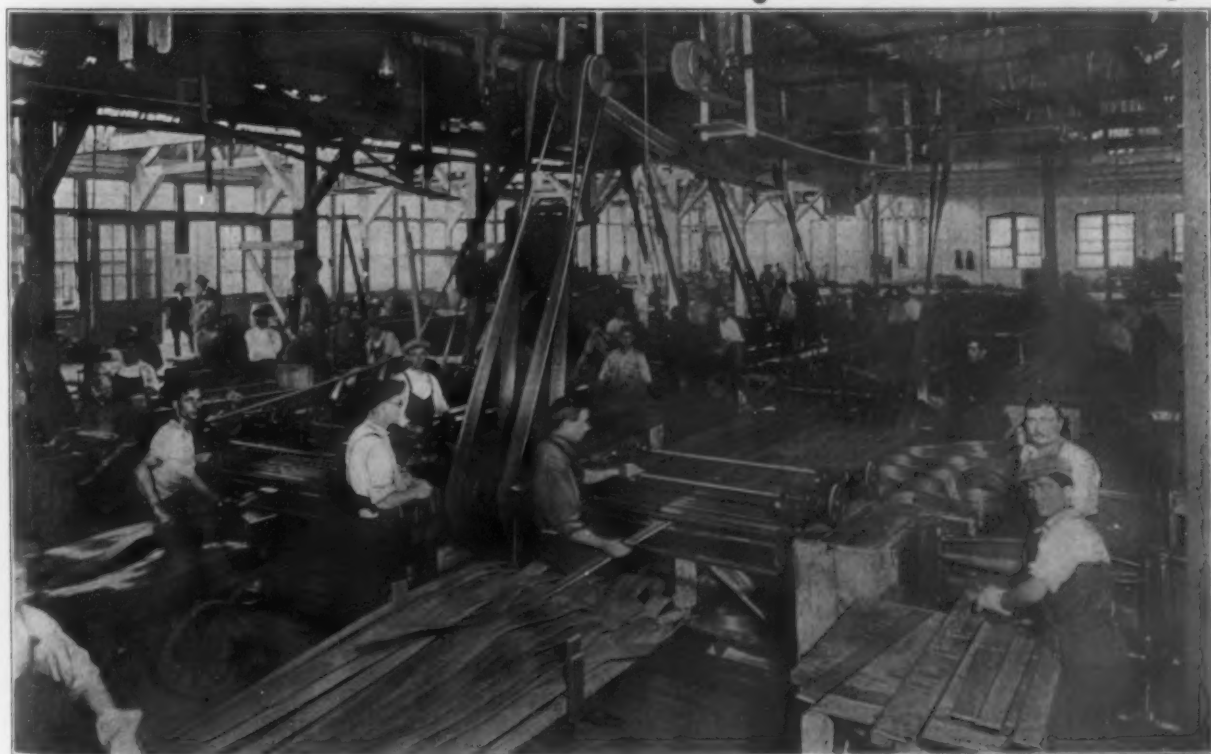
The truckloads of hot metal are hauled under this spraying arrangement which drenches the metal for about 3 min. The apparatus consists essentially of a perforated pipe with a quick-acting valve at one end. The floor is of checkered iron plates and the water is drained off to a filtering plant and cleansed for re-use.



This view of the slitting operation shows one of the older and simpler types of slitters. The thin gage brass here shown is trimmed on each edge and split into two strips of equal and accurate width. A more complex type of slitter has belt driven feed-in and feed-out rolls, the latter serving to rub down any burr that may be caused by the slitting knives.

off and the bars are cut in two. The cast bars are carried to an open space between the casting shop and the rolling mill which is used for the storage of such bars as the mill is not ready to receive. The industrial track system is arranged so that a car-load of bars from the storage yard can be run directly to the sticking or feeding side of the breaking down mill, supplanting the former method of carrying these heavy loads to the mill on mill trucks and obviating the extra handling necessary when mill trucks are used.

in the older portion of the rolling mill, the floors are of heavy wood planks fastened to sleepers laid in sand. In the new part of the mill, the floors are of wood blocks resting on a base of 6-in. reinforced concrete. A departure from standard practice was made in laying these blocks. Instead of being laid in sand alone, a 5-to-1 mixture of sand and cement was employed. This mixture was struck off and the surface sprinkled with water just in advance of the laying of the blocks. It has been found that by using the concrete mixture in place of straight sand



A view in the finishing department. In the immediate foreground are two sets of 17-roll straighteners, or as they are sometimes called flatteners, and a squaring shear. In the background are slitting machines and drying-out machines, which are long boxes in which the strips are driven by rolls through sawdust. On heavy material the drying-out is usually done by hand in similar boxes of sawdust.

the blocks do not tip under heavy loads owing to the increased stiffness of the mixture, yet but little of the cushioning effect of the sand is lost.

The seven stands of rolls comprise one set for breaking down, two sets for running down, and four sets for finishing. The breaking-down mill has 20 x 24-in. rolls and is driven by a 250-hp. motor. It is the common practice throughout both plants of the company to equip the mills with cut steel herringbone gears which practically eliminate all pinion or chatter marks on the stock being rolled. The running-down mill also has 20-in. rolls. There are three finishing mills with 18-in. rolls, and two finishing mills, used for thin gage metal, with 10-in. rolls. The 20-in. running-down mill and the 18-in. finishing mills are equipped with 3-roll motor-driven coiling machines of the latest type. The 10-in. finishing mills are equipped with fully automatic blocking machines. Four additional finishing mills of the latest type (as described later in this article in the description of No. 2 plant) are soon to be installed at this mill, together with additional motor equipment of about 1000 hp.

The overhauling—which is the trade name for the removal, after the breaking-down operation and previous to the passing of the bars through the running-down mill, of the scale and imperfections which are inherent in all cast bars—is accomplished by means of large milling machines called “slab millers” or by 12-in.-stroke crank-type overhauling machines.

Annealing Equipment and Methods

For annealing, which enters into the cycle of operations after every two or three passes through the rolls, this plant has one double-chamber muffle furnace of the oil under-fired type and two similar single-chamber muffles. The beds of these muffles are 30 ft. long. The floor on the charging side of the muffles is concrete and the cooling bed on the feed-out side is composed of checkered iron plates.

The bars and coils to be annealed are loaded directly from the mills on muffle pans which are placed on mill trucks that have platforms made of rolls to facilitate easy removal of the heavy loads. These muffle pans are long, thick sheets of iron, turned up at each end. Holes are bored in plates at the turned-up ends to accommodate the hook of the charging apparatus. When a muffle pan has received its full load, the truck is moved to the charging side of the furnace, ready to be hooked to one of the pans being annealed. By this method when one or two pans are removed a corresponding number are at the same time charged, thus combining in one operation the charging and discharging of pans of work. To the other end of the hook is attached a chain which passes around sheaves fastened to the floor and is wound up by a motor-driven winch. The whole appliance is usually spoken of as a “pan puller.”

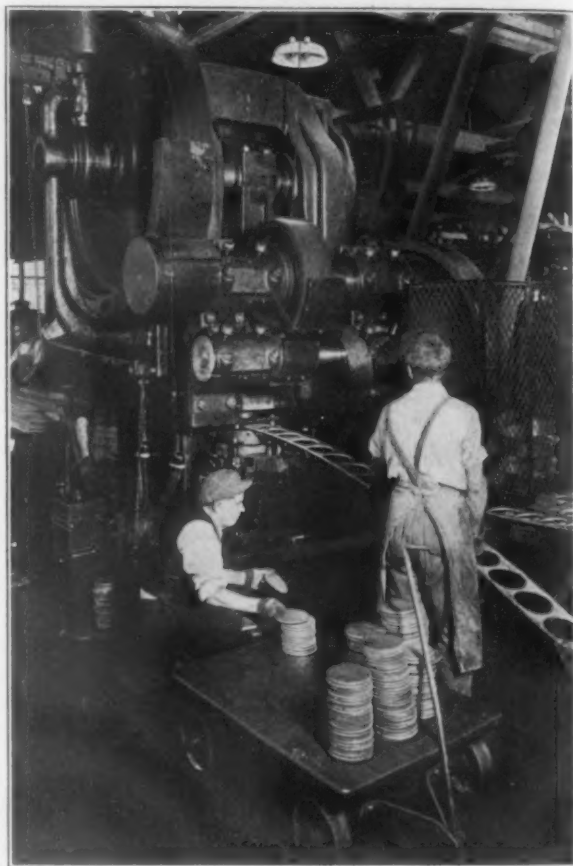
After the annealing period is over, the pans are pulled out in a similar manner on to mill trucks which are then hauled into position below one of the sets of sprays. The spraying apparatus consists of lengths of iron pipe, suspended horizontally, which are perforated with rows of small holes. At one end of the spray pipe is a quick-acting valve and the operation of drenching the pan of hot metal consumes but 2 to 4 min. Some of the alloys rolled at this mill it is necessary to air cool instead of water cool, due to the harmful effect on their structure that the quicker water cooling method would entail. This is particularly true of the nickel alloys.

For the pickling operation, the coils of metal are placed on racks which measure 3 x 5 ft. and hold from 1200 to 1500 lb. of metal. The pickling

is done in two tubs, measuring roughly 4 x 20 ft., which lie parallel and are served by an I-beam motor trolley crane. The first of the tubs contains the pickle bath, the second, water. A rack with its load of coils is lifted from a transveyor platform ready to be carried away. There is a set of pickle tubs in front of each of the 18-in. finishing mills and a set which serves the two 10-in. mills. In addition there are three sets in the space between the cooling bed and the finishing department.

Outline of Manufacturing Processes

The processes of casting, rolling and tempering brass and similar alloyed metals are well standardized. In weighing up metal for the casting shop



Punch press turning out the disks from which 3-in. cartridge cases are drawn. The disks are closely inspected for gage, diameter and finish by inspectors representing the purchaser. In the usual practice the scrap strip is cut into short length by shears which operate simultaneously with the punching die.

there is a definite mixture obtained to meet standards established by the laboratory. The metal pans contain usually 210 lb. which gives a normal charge for the crucibles used in the casting shops. Ordinarily one bar is cast from each pot of metal and these bars are then cut in two, leaving each section of an approximate weight of 100 lb. The molds are of two sections, having a parting line down the sides. The inside of each half is slushed and the halves joined together by driving wedges between the body of the mold and a stout rectangular clamp, called a mold band, which is slightly larger than the mold. The placing of the wedges and bands requires considerable care and experience in order that the cast bar may be perfect and not vary in gage between one side and the other.

After the bars are cast, the mold bands are removed by a sharp blow from a hammer, the mold falling apart. The bar is then lifted out by heavy tongs. After cooling, the gates are cut off and the bar cut in two sections by a large alligator shear. The cast bars are then conveyed to the mill storage

room from which they are weighed into the mill in 50-bar lots. The orders to the mill specify the gage and finish desired and the methods to be followed in the successive operations. The operations are all standardized, but vary according to the material to be rolled and the mill equipment to be employed. The cast bars are carried to the sticking-side of the breaking-down rolls on an industrial car and are run through a sufficient number of passes to bring the thickness of the bars down to a predetermined measure. From the breaking-down rolls, the bars are carried on mill trucks to the 9-roll straightening machines which flatten the bar, then to the overhauling machines where the surface is either milled off or trimmed off with a tool somewhat resembling a chisel to which is given a reciprocating motion. In this operation all scale and dirt is removed and also all defects which might cause splitting or checking in further rolling operations.

The bars are then taken to the annealing furnace and left in the furnace for a definite period under specified temperatures which vary according to the character of the metal and the results desired. After the first annealing the bars are cooled under the spray pipes and are then pickled and washed in water. The bars are now carried to the running-down mill, the number of passes in the running-down and the finishing mills varying according to the specifications for the finished product. Usually the metal is run through the mill for two or three passes, is annealed, continuing to pass through this cycle of operations until gage No. 10 (B. & S.) or thereabouts is reached at which point pickling and washing are added to the cycle of operations until the desired gage is reached. Before the final finishing passes, the coils of metal are pickled and left under water until the roller is ready to pass them through, in order to prevent surface oxidation. The cycle of operations sometimes varies from this standard procedure, due to special requirements in the final result. Due to the recent improvements in automatic blocking and coiling machines, the metal is now handled almost wholly in the form of coils from the time it leaves the running-down mill.

If the final product is to be of soft temper, the coils of metal go through the annealing and pickling operations once more and are then run through a drying-out machine. If the metal is to be left with a hard temper, it goes immediately from the finishing rolls to the slitter. In the slitting operation, the coil may be merely trimmed on each edge to obtain a precise and uniform width, or it may be split into two or more strips at one pass through the machine. Thin gage metal is again coiled as it leaves the slitter and then goes to the straightening rolls. If it is to be shipped in flat lengths, it is next sheared to length, and is then inspected for gage and finish. From the inspection benches it goes to the packing department, where it is weighed, packed and marked for shipment.

To give some typical operation, it is necessary to describe the number of runs and passes before the final product is secured. In making strips to be cut into disks for 3-in. shrapnel cases, there is one run of two passes through the breaking-down mill, one run of two passes through the running-down mill, and four passes through the finishing mill. Between each run of two or more passes the metal passes through the annealing cycle.

To make thin gage brass, say of 24 gage or 0.012 in., the number of rolling operations is greatly extended. In this case the cast bar is reduced from a thickness of approximately $1\frac{1}{4}$ in. to $\frac{5}{8}$ in. by two passes through the breaking-down mill. Re-

duction from $\frac{5}{8}$ in. to No. 0 is obtained by two passes through the running-down mill. From No. 0 to No. 5 requires two passes and the same number of passes are required from No. 5 to No. 10, from No. 10 to No. 15, and from No. 15 to No. 20. One pass then reduces the metal from No. 20 to No. 23. All of these runs are through the running-down mill.

The coils are then conveyed to the finishing mill where in two passes the metal is reduced from No. 23 to 0.012 in. There is a great variety of changes in the successive steps of production for different classes of metal, gage and finish. Continued study and extensive experiments have resulted in the establishment of standards which enable the planning department to issue production orders which contain precise instructions for each operation.

Finishing and Press Departments

The finishing department contains a variety of machines and appliances for turning the coils of metal into marketable shape. To describe in detail, each of these machines would require more space than is available in this article. The equipment includes sawdust drying boxes, slitters, straightening rolls (both belt and motor driven types), circular trimmer, coilers, automatic roll straightener and shearing machine, and several shears of the guillotine type.

In the press department are three 300-ton dinking presses with individual motor drives, three smaller dinking presses of which one is also equipped with shears, and a cupping press.

One corner of the rolling mill building is given over to a completely equipped machine shop. Adjoining this are a locker and wash rooms with modern installations of toilets and shower baths.

A new two-story structure, 75 x 135 ft. in size, adjoining the rolling mill, houses the offices and shipping room, the shipping room occupying the ground floor. The spur track runs close along one side of the shipping room and doors are provided so that four or more cars can be loaded at the same time. The shipping platform is inside the building, extending the full length of this side of the room and is served by an I-beam electric trolley crane. This crane is so arranged that the trolley can be run off on I-beams in each bay, affording convenient facilities for moving the heavy shipments to any point desired or to any car door. These facilities for handling freight, both incoming and outgoing, are so complete that freight cars are almost always released within the time allowance.

(To be continued)

As a result of the war, the "South American Year Book," the standard reference work on South America, is hereafter to be edited and published in the United States by the Americas Publishing & Printing Corporation, with offices in the Evening Post Building, 20 Vesey Street, New York. Heretofore this work has been published by the Louis Cassier Company, Ltd., London. It is the intention to increase the value of the book for the people of this country by editing it from an American standpoint. In furtherance of this idea, special attention will be given to information helpful to the extension of American commercial and financial interests in South America. The 1917 edition will appear in September. It will have the most complete map of South America so far printed, 30 x 40 in., in full color, compiled by Alexander Gross, F. R. G. S.

The Kieselguhr Company of America, 11 Broadway, New York City, maker of heat insulation for hot blast stoves and mains, annealing furnaces, etc., has changed its name to the Celite Products Company of New York.

TWO NEW DRILLING MACHINES

Addition of Multiple Heads and Use of Vernier Adaptors to Increase Output

A DRILLING and boring machine, designed to handle 3-in. high-speed drills, has been placed on the market by the Medina Machine Company, Medina, Ohio. It is designed with a view of adding special multiple boring heads for manufacturing work if desired. The machine, it is pointed out, is simple in construction and operation, being free from complicated levers or handles, with all levers at front of machine and in easy reach of operator. All gears are protected with guards.

The spindle is $3\frac{1}{2}$ in. in diameter and is driven by its largest diameter and close to the work. The spindle sleeves and spindle are crucible steel forgings, ground their entire length, the spindle sliding through a sleeve, which alone runs in bearings. The sleeve has a conical journal at the lower end. The upper end is straight, with a conical sleeve that fits closely over the spindle sleeve proper and is driven with the spindle sleeve by a key. The spindle head is rigidly fastened to the column and is self-contained in a unit with the spindle driving gear and feed mechanism. The bevel driving gear, feed worm and worm gear run in grease. The head is bored to receive solid Lumen bronze bearings for the spindle sleeve drive. With a driving pulley speed of 400 r.p.m., the spindle has eight speeds ranging from 54 to 414 r.p.m. The drive is direct from the bevel pinion of the speed gearbox to the large bevel driving gear mounted on the spindle sleeve. The bevel gear drives the spindle through the sleeve with the two steel keys. The thrust of the bevel driving gear and the two spindle driving keys are taken on an S. K. F. thrust bearing. The machine is equipped with a Johnson double friction clutch for starting and stopping.

The driving gears run in oil in a speed box having a tight-fitting cover. There are nine hardened steel

change and four semi-steel wide-face gears that operate from the clutch. Only two idler gears are in mesh when the machine is in operation. Gear changes are made by a roll-in gear. The drive, whether by belt or motor, is at constant speed. When the latter is used the motor can be mounted on a bracket in the rear of the machine, and if an adjustable-speed motor is employed, the gearbox can be eliminated. For single-purpose manufacturing work the speed box can be eliminated and a single-speed drive or a three-step cone pulley and a countershaft used.

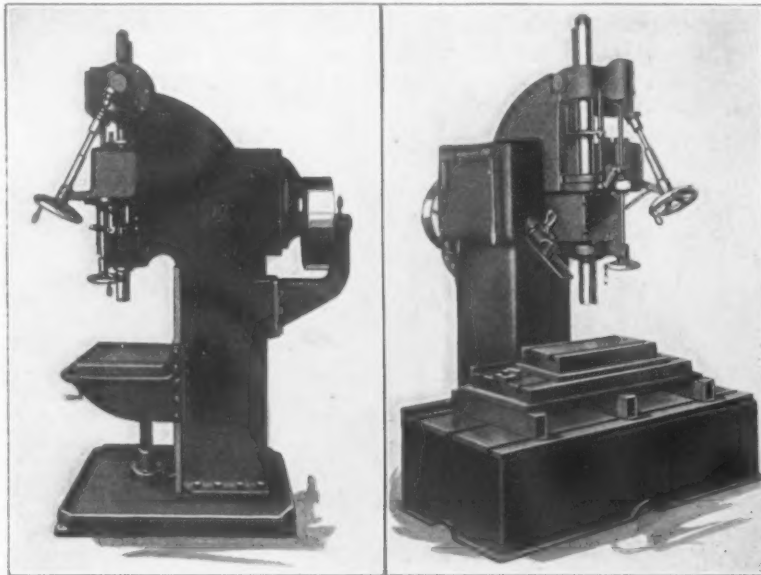
A vertical spindle traverse of 14 in. is provided. Four speed changes ranging from 0.006 to 0.032 in. per revolution of the spindle are secured by slip key and sliding semi-steel gears. To protect the feed mechanism the feed gear is provided with a safety friction. The machine has an automatic knock-off to disengage the feed clutch.

The table is of plain box section, strongly ribbed, and has a channel around the edge to carry off compound. It is provided with heavy straps to secure the table to the

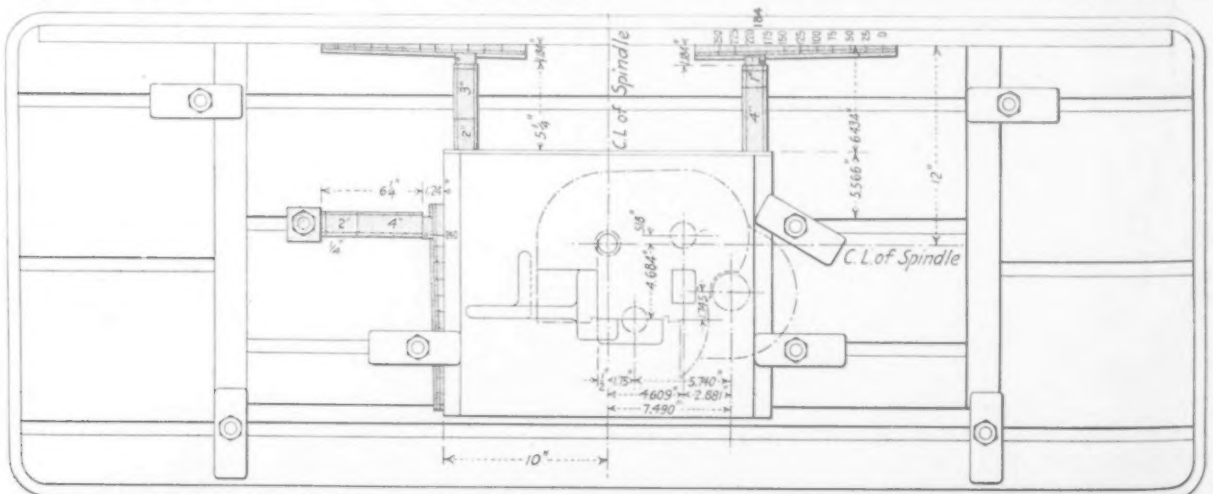
column and keep it in alignment. The table has a liberal bearing surface on the column. The working surface of the table is 19 x 20 in. and its lift is $16\frac{1}{4}$ in. The maximum distance from the spindle end to the table is 32 in. The distance from the center of the spindle to the face of the column above the knee is 12 in. The table is raised and lowered by a jack screw.

The company has also brought out a drilling, boring and spacing machine, that in addition to being a vertical boring machine with the essential constructional features, operating parts and dimensions similar to those of the machine described above, is designed for jig boring work and for boring holes to a close limit without the use of jigs for manufacturing work. This is possible by the use of a set of gage blocks and an adaptor gage in connection therewith. It is stated that with the use of these, holes can be spaced within 0.00001 in. as readily as by the use of the micrometer or other measuring devices.

This machine has a base with a working surface of



Multiple Boring Heads Can Be Added to the Boring and Drilling Machine at the Left to Adapt It for Manufacturing Work, while the Use of a Vernier Adaptor in Conjunction with Standard Gage Blocks Enables the Machine at the Right to Drill Sets of Irregularly Spaced Holes Easily without Employing Jigs



How the Gage Blocks and a Set of Vernier Adaptors Are Employed for Drilling Irregularly Spaced Holes

27 in. x 6 ft., which is provided with three T-slots running lengthways for clamping jigs, work table or angle plate. At the rear of the base is a planed cast strip lined with hardened steel blocks, against which are set gage blocks. Two platens are provided, one with a working surface of 22 x 48 in. and the other with a working surface of 16 x 18 in., both being 6 in. high. The larger platen has three T-slots for holding the work or clamping down the smaller platen. It has two square working edges, provided with hardened strips for the use of gage blocks. There are clamping strips at the ends and sides for fastening to the table. The smaller platen is used in connection with either the base or with the larger platen as desired. This platen has two T-slots for holding the work. It also has clamping edges, and steel blocks are inserted for gaging surfaces the same as the larger platen. Three parallels $4\frac{1}{4}$ x 6 x 28 in. are provided to set up the larger platen to suit the work when desired, so that the smaller platen can be floated around on top to suit the setting for spacing with the gage blocks.

A gage block end stop is provided to fit the center slot in the base or the larger platen. This has a hardened steel face to set the gage blocks against and clamping bolts to hold it in any desired location. The gage blocks are provided in three sets and are made of hardened ground and lapped tool steel in seven lengths from $\frac{1}{4}$ to 7 in. Any variation in the gage blocks is etched in, making them accurate to within 0.00001 in. The blocks are used to advantage with the adaptor gage and also with the Johannsen blocks when desired.

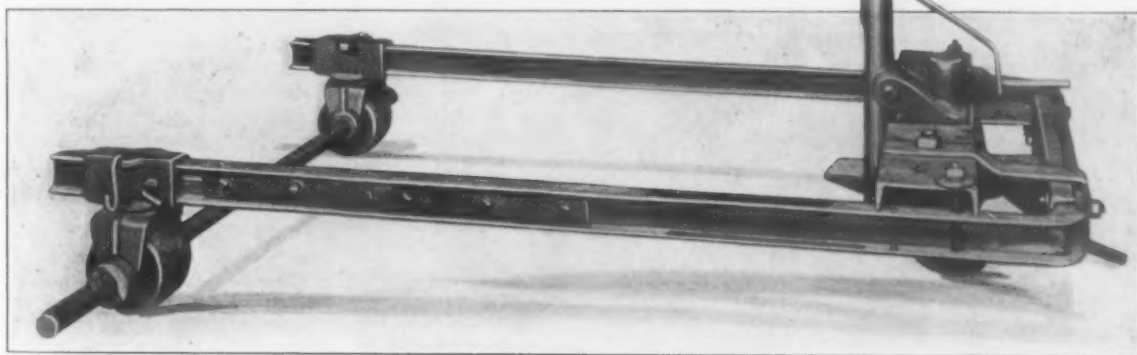
The adaptor gage is hardened, ground and lapped and is provided with a Vernier scale divided into 250 1-mm. spaces, and a Vernier strip with 100 spaces makes

Adjustable Lift Truck for Heavy Loads

An interesting type of truck for handling machinery, large castings, general freight, etc., is being built by the F. J. Bloodgood Company, Binghamton, N. Y. It has a capacity for loads ranging from 1000 to 6000 lb. and is designed and constructed to eliminate the use of loose rollers in transferring heavy objects, as well as being adjustable for loads of various widths and lengths.

The truck has a U-shaped frame, the opening for the reception of the object to be lifted being toward the rear. A powerful lifting jack is attached to the base of the U at the front of the truck. The truck is guided by a tongue attached to the front of the carriage and, it is emphasized, can be turned around within its own length. The frame can be adjusted to take care of variations in the width of the load, while the wheel carriages on the sides of the frame can be slid along for the length, or, if necessary, additional sections can be bolted on. In this way, it is pointed out, the truck adjusts itself in position around the load instead of requiring the latter to be moved to the truck.

When it is desired to load a piece of machinery or other article, the foot piece of the screw jack is placed underneath. The jack is then operated by the two arms until the article is raised sufficiently in front to permit a bar to be inserted through the rear wheels which are



The Load to Be Carried by This Truck Is Raised by the Jack at the Right Until It Clears the Floor Sufficiently for a Roller to Be Slipped Through the Rear Wheels

it possible by the wedge construction to get within 0.00001-in. spacings up to 25,000 spaces or $\frac{1}{4}$ in. Three adaptor gages are provided for each machine in connection with gage blocks, one being used on the end and two on each side of the platen for spacing. The scales are placed so that they are visible when the adaptor rests on the platen. It is pointed out that spacing with these blocks eliminates the trouble experienced with a screw and saves trial boring cuts to space, as is the case in usual hole spacing.

The general specifications of both machines are the same. When desired, the second machine is furnished with a compound table clamped to the base. This table has both longitudinal and transverse slides provided with coarse-pitch screws and dials for spacing. It is regularly built with the upright clamped to the base, but a knee or sliding table construction can be provided when desired. An angle plate and hardened steel blocks for use as set blocks are furnished as special parts.

The Swastika Flexible Metals Company, recently incorporated with a capital stock of \$250,000, by Louis C. Pritchard, U. R. Talbot, Edgar M. Hirsch, and others, has acquired the plant of the Alloys Foundry Company, Warwick, Ohio, and will manufacture various alloy steels under a patent process. The plant is being enlarged. The company's offices are at 909 Swetland Building, Cleveland.

placed slightly back of the center of the load. When this is done, the jack is lowered until the rear end of the load clears the floor. The greater portion of the load is then supported by the roller bearing wheels at the rear, the frame not being relied upon to any great extent for support. After the article has been loaded it can be moved without stopping to the desired location, as no replacing or changing of rollers is required.

The truck weighs about 4000 lb. and can be taken apart and put together again in 10 min., it being emphasized that only one man is required to load and unload the bulky articles carried. In a recent test of one of these trucks, a large leather cutting machine weighing 8500 lb. and measuring 12 ft. in length and 5 ft. in width and 7 ft. high was loaded and placed in position in 10 min. by one of the trucks.

The new foundry of the Gartland-Carroll Foundry Company, Sandusky, Ohio, is about completed, and it is expected to be in operation in a few days. The plant consists of two buildings, one 300 x 100 ft., and the other 100 x 100 ft. J. J. Carroll is vice-president and general manager.

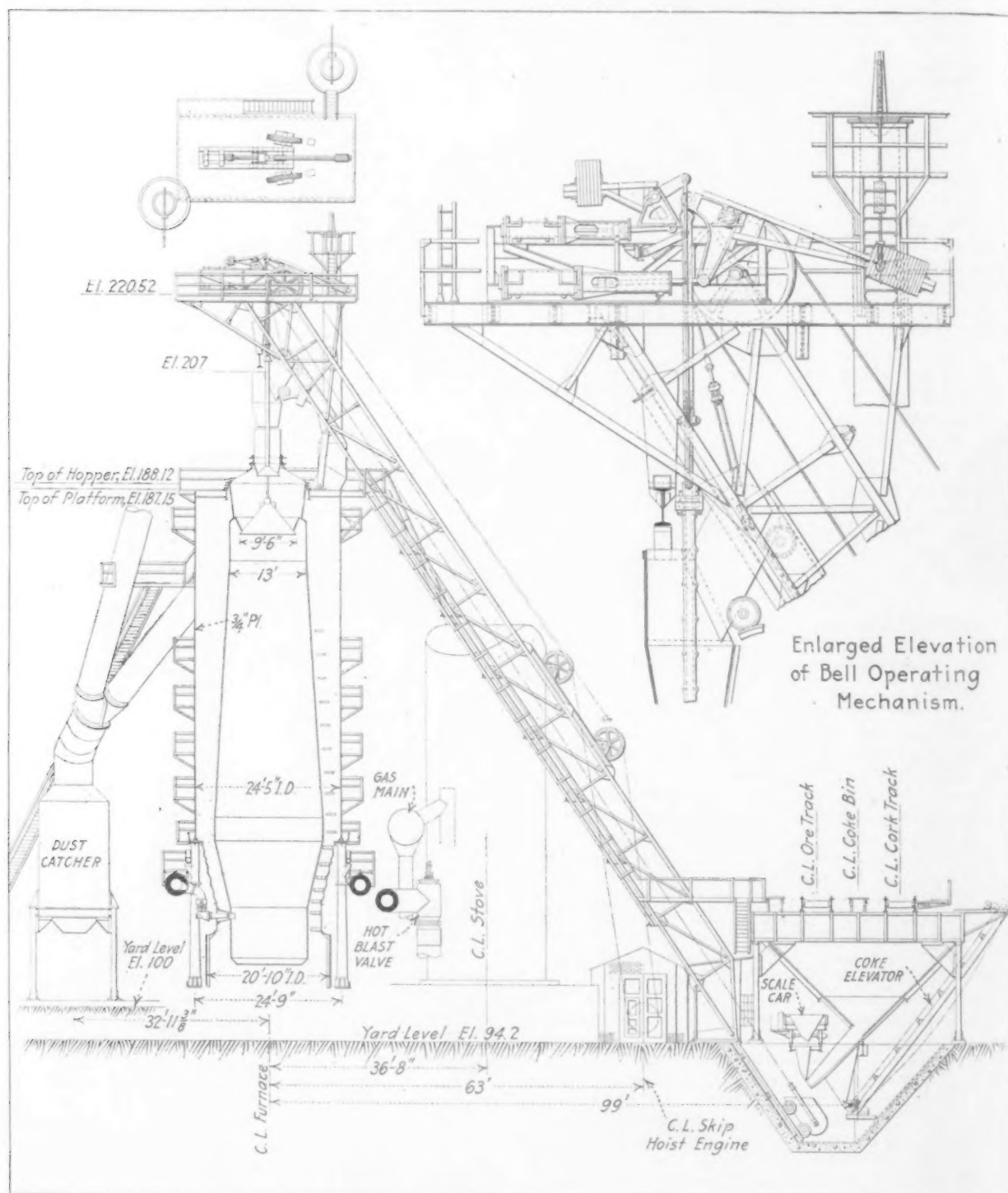
The Findlay Steel Castings Company has purchased the plant in Findlay, Ohio, formerly occupied by the Grant Motor Company, and will equip it for the manufacture of steel castings.

Allowing Blast-Furnace Shaft to Expand

Noteworthy Features of the Rebuilt Plant of the Pulaski Iron Company — Modified Top and New Ore and Coke Bins

SOME remarkable mechanical engineering achievements have been made in the rebuilding of a blast-furnace plant at Pulaski, Va. Foremost is the provision of vertical expansion

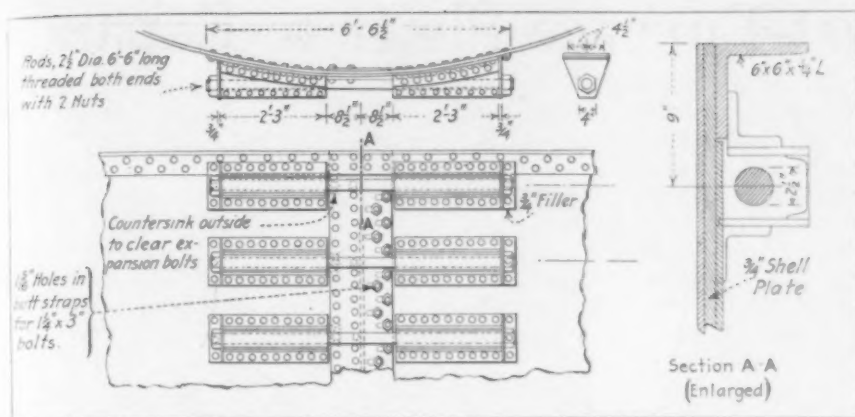
of which the upper parts are of concrete and the bottoms of suspended steel work; in a new form of screen in the coke discharge to the skip cars; in the arrangement for disposing of the coke



The shell of the furnace stack was made cylindrical. Vertical diametrically opposite expansion joints were provided to allow for the gradual growth of the lining of the furnace which smelts a zinc-carrying ore. An elevator takes the coke breeze from the skip pit

joints in the shell of the furnace shaft to allow for a gradual increase in the volume of the lining resulting from the action of zinc in the iron ore. Other outstanding features are found in ore bins,

breeze; in the design and disposition of the bell operating mechanism at the furnace top; in the scheme to remove zinc oxide which builds up in the gas pipes, and in the provision of points of



A series of 2 1/2-in. bolts forms the main members of the expansion joints of the furnace shell. Periodic inspection will disclose any bolt which has been overstretched

access to the top of the shaft to care for the vertical expansion of the lining. In the new equipment, turbine-driven centrifugal compressors are used for blowing.

The work was done last summer for the Pulaski Iron Company and the plant has now been in operation for some time. The old furnace and foundation were removed and replaced by a modern skip-filled stack of increased capacity. Stock trestles, storage bins and stock-handling equipment of improved types were installed; the old blowing engines were replaced, as stated, by turbine-driven centrifugal compressors and the power-house equipment augmented by the addition of two turbine-driven generator units, together with complete condensing equipment and a feed-water heater. The boiler plant was overhauled and furnished with new steam and gas piping. One hot blast stove was removed to make room for the new skip bridge, and another hot blast stove was increased in height from 60 ft. to 100 ft. The cast house was equipped with a 10-ton crane and a pig breaker. Various other labor saving devices and improvements were installed to bring the plant to a high degree of efficiency.

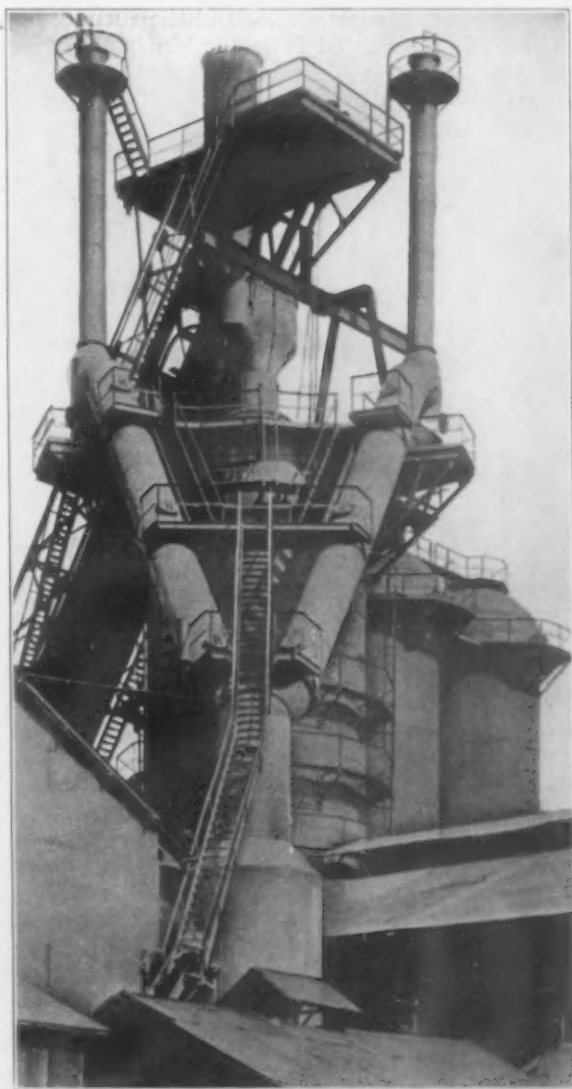
The Pulaski Iron Company has for years been successful in mining and smelting Virginia ores, as well as reducing large quantities of nodulized material obtained from the iron content of native pyrites. There are several unusual problems involved in successfully smelting these materials, which necessitate certain deviations from standard blast furnace construction practice. The chief difficulties encountered are due to the presence in the ore of small quantities of certain forms of zinc. The zinc sometimes reaches the upper portions of the bosh and appears at joints in the brickwork in thin sheets of the pure metal. Most of the zinc contained in the furnace charge, however, never reaches the lower portions of the furnace. It is volatilized some distance above the mantle and attacks the firebrick lining, and particularly the fire clay joints, forming a compound with alumina which expands as it is formed. This action is slow, but progresses throughout the life of the furnace lining and causes the lining to expand in all directions. The results of this expansion have been manifest by burst vertical and horizontal joints in the furnace shell. To overcome this difficulty at Pulaski the shell was made cylindrical in form and provided with two vertical expansion joints along the entire height of the shell and 180 deg. apart.

Another source of annoyance due to the presence of zinc in the furnace charge has been a clogging and stoppage of the gas passage, resulting

from the deposit of a peculiar form of zinc oxide. The presence of zinc oxide in the reducing furnace gases has been explained by the fact that zinc has a greater affinity for the oxygen in CO, than the CO gas has for the additional atom of oxygen. These finely divided portions of zinc oxide build up in a stalactite formation on the comparatively cooler surfaces of the down-comer and dust-catcher, so that periodical shut-downs are necessary to remove the deposits. Certain unusual down-comer construction is used to facilitate this removal,

as will hereafter be noted.

Furnace materials are received under ordinary conditions at Pulaski with a fair degree of regularity and are discharged directly from railroad cars into stock bins. Only a comparatively small tonnage of materials is stored, and elaborate handling equipment is not necessary. Two stock trestles are provided and the materials are handled by clam-shell buckets and locomotive cranes. One of the trestles is a single-track ore-crusher trestle 238 ft. 6 in. long, the other a bin and storage trestle 678 ft. long. Both trestles have reinforced concrete bents, steel track stringers and 80-lb. rails, and are

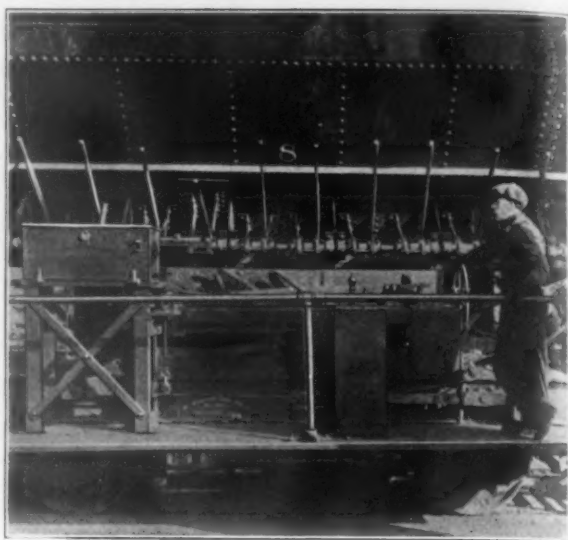


Platforms and stairways provide for reaching the man-holes for cleaning out the down-comers.

provided with suitable walks, hand rails and stairways. Heavy angles at the corner of the bents protect the concrete from the damaging action of the clam-shell bucket. The track stringers transfer their load to the concrete bent through heavy bearing plates and a top frame of heavy angles securely bolted down and grouted to prevent spalling or wear of the concrete due to impact or abrasion. Longitudinal bracing is obtained by two methods; structural cross bracing is used in the tower sections of storage trestle and a solid longitudinal concrete wall is used for bracing between the bin columns.

The ore-crusher trestle provides for considerable storage of materials, and is arranged so that certain coarse native ores may be dumped directly from cars into a track hopper and fed into a single-roll motor-driven crusher, which discharges through a chute into a standard-gage railroad car at yard level. The bin storage trestle is made up of 228 ft. of approach trestle to the bins, 54 ft. of coke bin, 196 ft. of ore and stone bins and 200 ft. of tail trestle. A double track at 14 ft. centers extends its entire length. The approach trestle has a 2.19 per cent grade, easing off to $\frac{1}{2}$ per cent grade over bins and tail trestle.

The coke bin is of all steel construction, 33 ft. wide by 54 ft. long with 45 deg. sloping bottom and double discharge openings at the bottom directly over the center line of the skip cars. The mechanically operated fork type of coke gate is arranged to be operated from the control shed at the side of the skip pit. In this connection, it may be noted that the control operator charges the coke as well as operating both the skip hoist and the furnace bells. The coke is discharged from the bin in thin layers over cast-iron finger-bar coke screens patented by Arthur G. McKee. These are about 3 ft. in width and 8 ft. long and of a design shown in one of the accompanying drawings. They deliver directly into skip cars and the coke breeze passing through the finger-bar screen is caught in a steel pocket. This discharges into the boot of the continuously op-



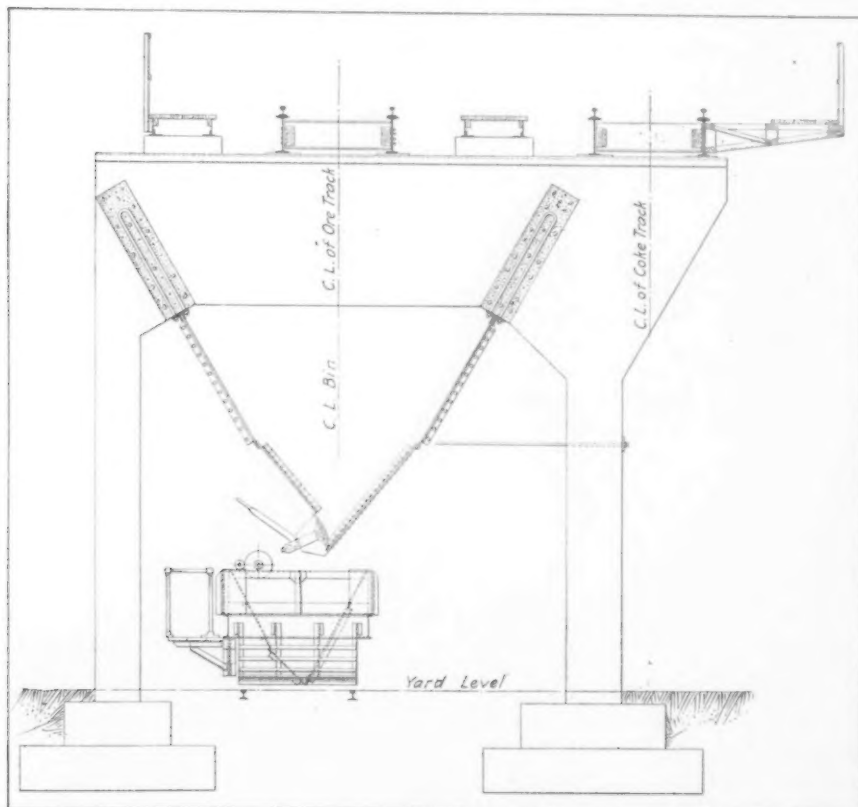
The Scale Car and Line of Bin Gates

rated 12-in. bucket elevator, which lifts the breeze into a railroad car at yard level.

Each of the fourteen Baker suspension type ore and stone bins has 150 tons of ore capacity. These bins are of steel and are suspended from heavily reinforced inclined concrete girders. The partitions are so located that the hand-operated discharge gates form a continuous line. The steep sides and continuous discharge gates insure that a bin may be emptied without poking. The considerable use of concrete in the construction of the ore bins and trestles is in part a commentary on the difficulty of securing steel. Previously the Baker bins have been of all-steel construction, but in this case only the hoppers are of steel. The bins discharge into a motor-driven scale car of 5 tons capacity, which is of all-steel construction, of the side-platform type. It has hand-operated doors, which discharge through chutes into the skip cars.

A double track through-type skip bridge has been built. The skip cars, of 100 cu. ft. capacity, are hoisted by a 12 x 14-in. Otis steam elevator hoist. The upper end of this bridge is supported from the furnace shell by pin connected struts. The skip cars at the top of the furnace discharge through a stationary guide hopper into the motor-driven hopper of the McKee revolving stock distributor.

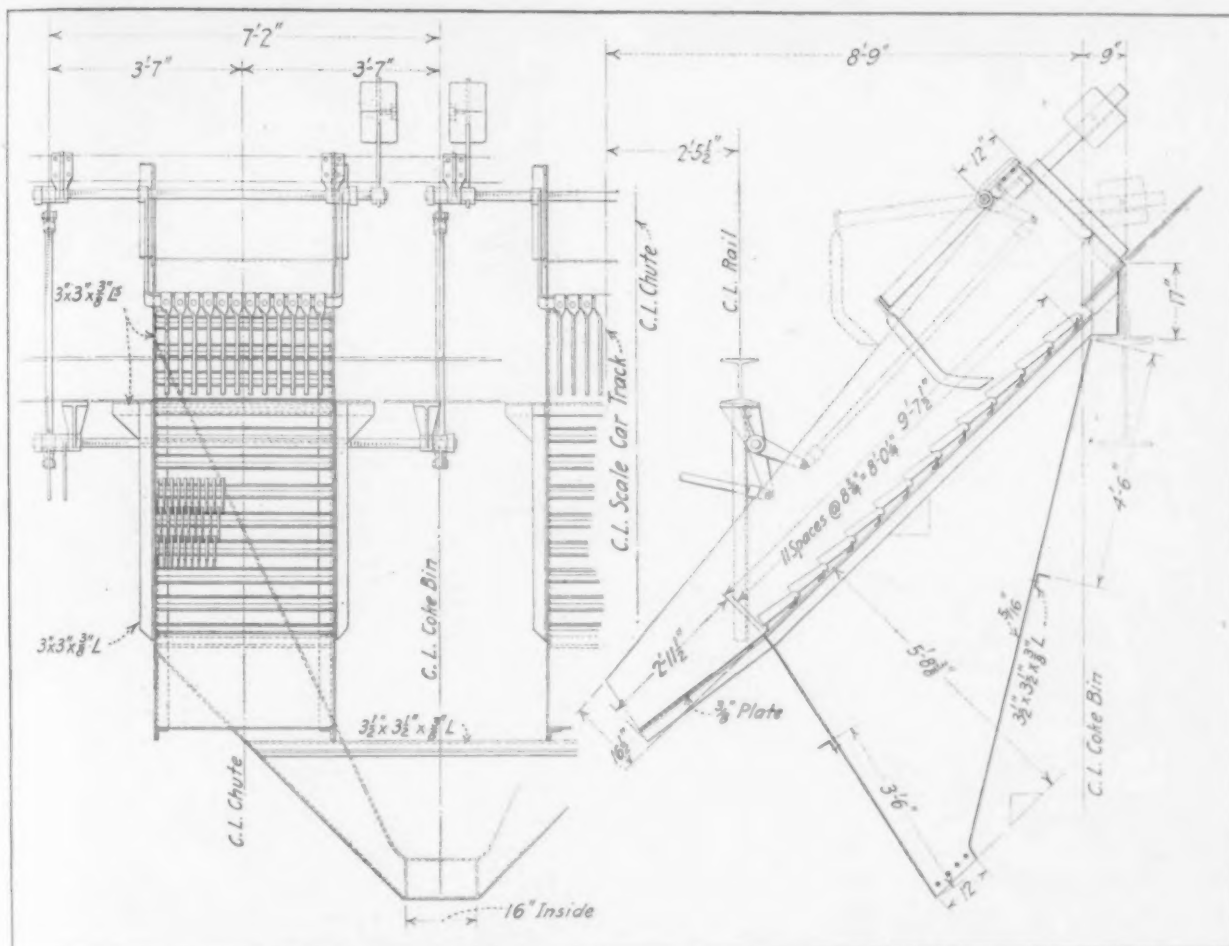
The bell-operating mechanism is entirely clear of the furnace platform and is supported by a platform on top of the skip bridge directly above the furnace platform. The bell cylinders are steam driven and controlled by the operator at the skip pit. Both cylinders are horizontally disposed, as indicated in one of the drawings, and operate the bell rods through counterweighted bell cranks and a straight-line motion. The cylinders and bell cranks are arranged so that they may be shifted in any horizontal direction. The ob-



The steel suspension bins are fastened to long steel loops imbedded in the inclined concrete girders forming the upper part of the bins

ject is to keep the bell rods vertical and both bells exactly on the center line of the furnace at all times, even though the relative position of the furnace and the skip bridge may be somewhat changed by forces due to unequal expansion. This arrangement of sheaves and bell-operating mechanism leaves the furnace platform entirely clear so that in the case of changing a big bell there is room for disposing of the gas seal and revolving distributor. A trolley beam capable of handling all parts of the furnace top is so placed that the big bell may be hoisted from the yard level and lowered into place, or vice versa, with the minimum of time and labor.

bleeders are 36 in. in inside diameter and the down-comers 4 ft. 9 in. in inside diameter. Both are lined with $4\frac{1}{2}$ in. of firebrick. At the point above the 12-ft. dust catcher where the two down-comer branches are joined together, there is a steel casting to form the Y portion of the down-comer. This casting has no firebrick lining and thus avoids the difficulty usually experienced in holding firebrick in this portion of the gas system. Provisions for removing zinc deposits from the down-comer and dust catcher consist of a series of manholes made easily accessible by means of stairs and platforms of ample proportions. It may be further noted that the down-



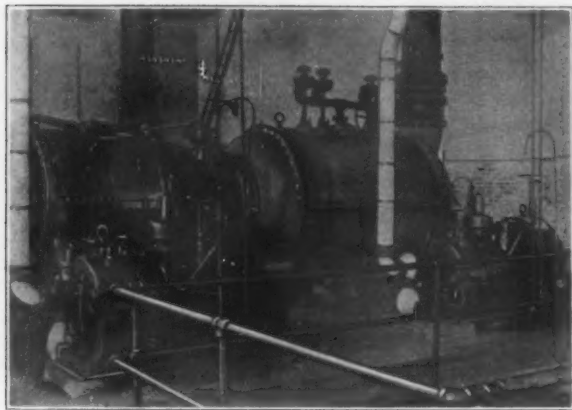
The screen over which the coke passes to the skip car is made up of small cast-iron fingers. The coke gate is operated from the skip pit. The breeze falling into the small bin shown is delivered to the boot of an elevator.

The furnace lining is 13 ft. in diameter at the hearth, 18 ft. $1\frac{7}{8}$ in. in diameter at the bosh and 13 ft. in diameter at the stock line. The big bell is 9 ft. 6 in. in diameter with a 50-deg. slope. The bosh angle is 77 deg. while the inwall slope is 86 deg. 36 min. from the horizontal. The furnace has ten cast-iron columns and ten tuyeres. The bustle pipe is 3 ft. 9 in. in inside diameter and is lined with 4 in. of non-pareil insulating brick and $4\frac{1}{2}$ in. of firebrick. The hearth jacket is $1\frac{1}{8}$ in. in thickness, 9 ft. in height by 20 ft. 10 in. in diameter, and is cooled by cast-iron plates 3 ft. in thickness and 9 ft. high. The tuyere jacket is $\frac{7}{8}$ in. in thickness by 4 ft. $7\frac{1}{2}$ in. high and 17 ft. 6 in. in diameter, and is heavily reinforced by angles and steel castings. There are five bosh bands 1×12 in. in cross-section; seven rows of copper cooling plates, six of which are above the center line of tuyeres. Above the mantle, the furnace is cooled by ten rows of cast-iron cooling plates.

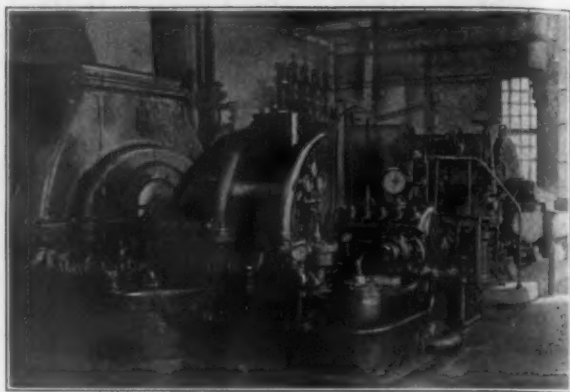
There are two gas outlets, from each of which there is a down-comer and bleeder connection. The

comers are unusually steep, so that the zinc deposits may be pried loose and allowed to fall into the dust catcher.

The furnace shell is 24 ft. 5 in. in inside diameter and made up of $\frac{3}{4}$ -in. plate in rings about 8 ft. high. All rings are in four pieces and the vertical seams are not staggered. The shell is made in two halves and tied together on opposite sides at points $19\frac{1}{2}$ in. apart by $2\frac{1}{2}$ -in. bolts, $6\frac{1}{2}$ ft. long. All other joints of the plate work except those vertical seams forming the expansion joint, are made with butt straps and $\frac{7}{8}$ -in. rivets flattened to $\frac{3}{8}$ in. high on the inside of the shell. As the force exerted by the expanding brick work is practically irresistible, it was thought advisable to design a joint which would hold under ordinary strain, but which would fail at a known point in case of excessive stress. The $2\frac{1}{2}$ -in. bolts are proportioned so that they should fail before the furnace shell is strained to a dangerous point. Suitable galleries and stairs around the circumference of the shell at several elevations serve to insure easy inspection and prompt repair.



New General Electric Four-stage Centrifugal Air Compressor



New Ingersoll-Rand Turbine Driven Centrifugal Air Compressor

Provisions for overcoming the disastrous effects of vertical expansion in the firebrick lining consist of a series of manhole openings in the top ring of the furnace shell arranged so that inspection and removal of the top courses of firebrick is easily effected while the furnace is in operation.

The new power house installation includes the following units: An Ingersoll-Rand turbine-driven centrifugal air compressor, with a capacity of 33,000 cu. ft. per min. when working against a gage pressure of 14 lb. The steam turbine is of the multi-stage impulse type with velocity stages; the air end consists of four rotors in four water-cooled stages. A General Electric four-stage centrifugal air compressor, driven by a two-stage Curtis steam turbine. The free-air capacity of this machine is 30,000 cu. ft. against 14-lb. gage pressure. The condensing equipment includes a Westinghouse-LeBlanc barometric condenser with tail pipe served by a Westinghouse LeBlanc centrifugal air pump, direct-connected to a Westinghouse centrifugal circulating pump, both of which are driven through reduction gears by a 38½-hp. steam turbine. Two 75-kw., 250-volt direct-current Westinghouse geared steam turbine units for electric lighting and power purposes.

The dismantling of the old work and the design and installation of new blast furnace and power plant were executed by the contracting firm of Arthur G. McKee & Co., Cleveland, Ohio.

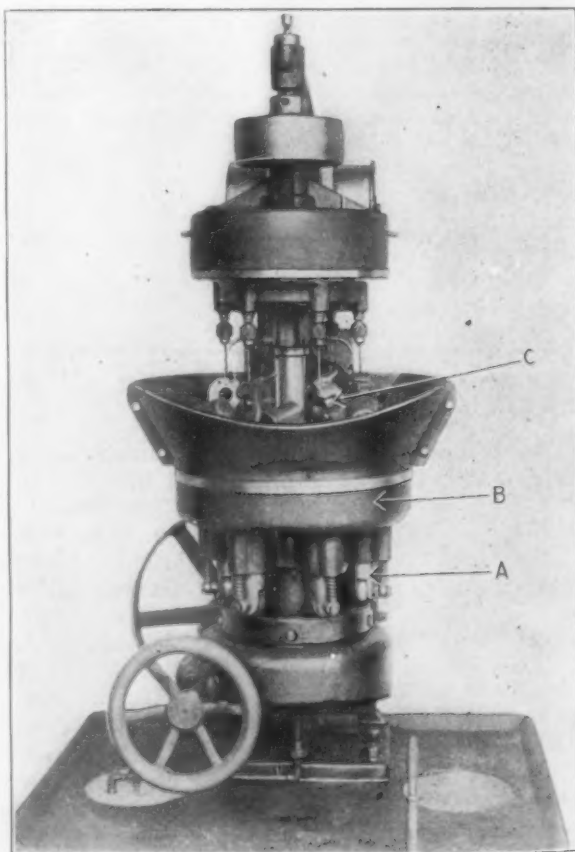
Continuous Shrapnel Drilling Machine

The Langelier Mfg. Company, Providence, R. I., has adapted one of its semi-automatic continuous feed drilling machines for the production of fuse bodies of the Russian 3-in. shrapnel shells. The machine is, of course, designed to take a variety of work but in this particular case is equipped with semi-automatic jigs for drilling holes 0.128 in. in diameter at an angle to the axis of the fuse body, the rate of production being 10 pieces per minute. With the exception of loading and unloading the jigs the performance of the machine is entirely automatic, the operator simply removing the drilled pieces and replacing them with new ones as the jigs successively pass the front of the machine.

The machine has six spindles arranged radially in a single head, the jigs being located directly underneath with the guide bushings in alignment with the drills. Each of the jigs is attached to a separate platen, mounted on a foot *A* which is given a vertical movement by a roller riding on a cam underneath. The platens are contained in a common carrier *B* which, together with the drill spindle head, is keyed to the large shaft in the center. The carrier and the drill head revolve slowly with this shaft, the rollers on the platen feet riding upon the cam during the revolution and thus feeding the work upward against the drills. This rise continues until the hole is drilled to the proper depth, the platens

receding in turn just before reaching the front of the machine. The compression springs just above the rollers are relied upon to keep them bearing against the cam.

The work is located centrally in the jig by a bushing which shows through the cutout at *C*. A locating pawl with a trigger for manual operation is provided at the top of the jig and serves to locate the hole to be drilled with relation to the one already drilled by engaging a slot in the periphery of the work. The fuse block is clamped automatically between a fixed plate and a movable jaw, the latter being actuated by a spring plunger into which a rack is cut. A pinion, the shaft of which is forged integral with a lever, engages the rack, while a roller is mounted on the lever. This roller engages a cam attached inside of the chip guard at the loading station, depressing the plunger and opening the jaws. In this way the work is easily removed and an-

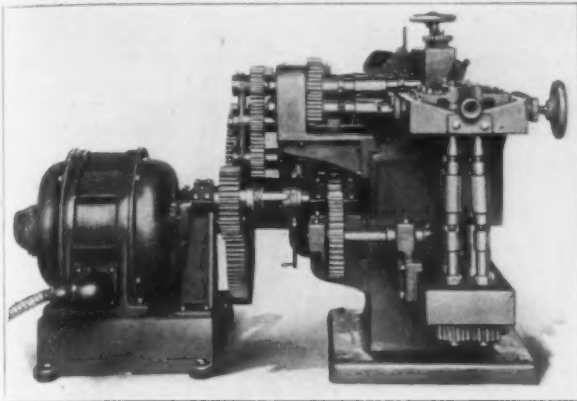


Holes 0.128 In. in Diameter Are Drilled at an Angle in Six Fuse Bodies for 3-In. Shrapnel Simultaneously, the Output Being 10 Pieces per Minute

other blank inserted, the jaws closing as soon as the roller leaves the cam and the drilling operation starting immediately.

Strip Straightening and Cutting Machine

The F. B. Shuster Company, New Haven, has added a motor-driven geared machine to its line of straightening and cutting machinery for square, hexagon and flat strip stock. Square or hexagon material ranging from $\frac{1}{4}$ to $\frac{1}{2}$ in. is taken from the coil and straightened by this machine, after which it is cut off to any desired length. Flat stock, ranging in thickness from $\frac{1}{8}$ to $\frac{1}{4}$ in. and from $\frac{3}{8}$ to $\frac{3}{4}$ in. in width, can also be handled.



The Power for Driving the Six Vertical and Six Horizontal Straightening Rolls Is Transmitted from the Driving Motor Through Gearing and a Clutch. Universal Joints in the Spindles Caring for the Variation in the Size of the Rolls

The machine consists of a bed supporting a housing containing six vertical and six horizontal straightening rolls. Two sets of feed rolls are provided, one at the front of the machine and the other at the rear where the stock enters. All of the roll shafts and the roll gear shafts are connected through ball joints and sleeves, this arrangement being relied upon to permit the roll gears to remain in the same position at all times. It also provides independent adjustment for the rolls so that several sizes of material of one shape can be handled without changing the rolls. As is the case with the builder's other machines, a clutch mechanism is provided to stop the feeding of the material while the cutting off is being done.

In operation the material is taken from the coil, passes through special guides into the rear feed rolls which force it along through the straightening rolls and then enters between the front feed rolls. The stock

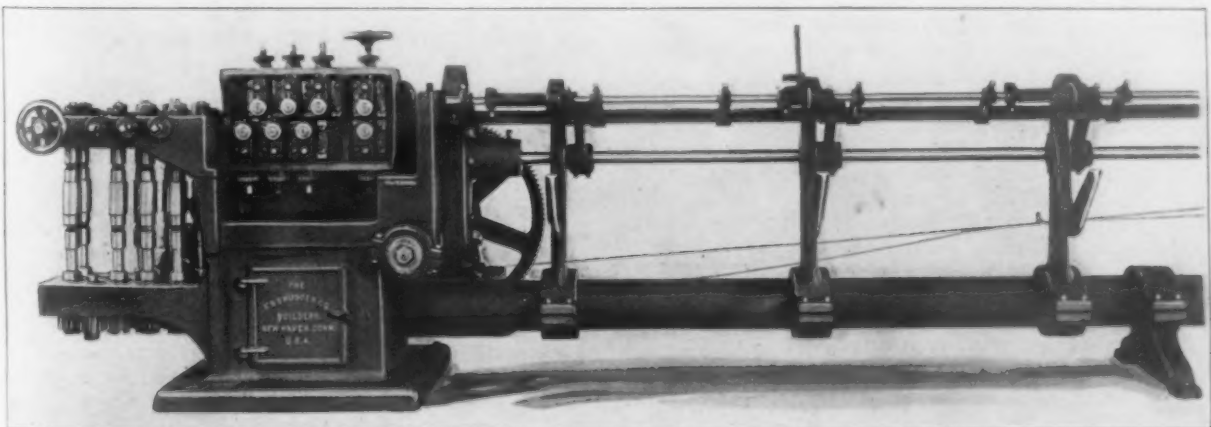
Combustion Engineering Corporation's Stokers

G. E. Learnard, vice-president and general manager of the Combustion Engineering Corporation, 11 Broadway, New York, states that over 1,500,000 hp. is now being developed with its type E stokers, in addition to which considerably over 500,000 hp. of its Coxe stokers for anthracite coal is in use. None of this business is in any way directly traceable to the conditions brought about by the war, all who are using these machines being in staple lines of business not affected by external conditions, such as the power and trolley companies and concerns manufacturing articles of such a nature that they do not lend themselves particularly to export.

On the other hand, in the company's type H stokers there probably was some such stimulation in sales due to the tremendous activity of the steel mills. For a number of years prior to the present situation which brought about the enormous demand for steel, the type H stoker grew to be a standard part of the equipment of steel plants operating coal-fired furnaces, and in the present period of expansion of the steel mills of the country hundreds of these machines have been supplied. Another factor contributing to the expansion of the company's business is the development of the by-product coke oven and the number of plants that have been erected for the recovery of benzol and other products. The company's Coxe stoker is now in use in leading by-product coke plants.

Blast-Furnace Versus Portland Cement

Whether blast-furnace cement—that made from blast-furnace slag—or Portland cement will the better withstand sea water and mine waters containing solutions of salt or acids is causing a spirited controversy in Germany, according to the *London Iron and Coal Trades Review*. Dr. Herman Passow issued in 1913 a pamphlet on the subject, maintaining the immunity of slag cement in this respect, but was attacked by two representatives of the German Portland cement industry. Dr. Passow has now published his rejoinder. An impartial reviewer who has read what both sides had to say on the subject has come to the conclusion that the cement which, generally speaking, is not affected by any kind of mine water does not yet exist and must have a great future when invented. Until then each mine water will have to be dealt with on its own merits and a cement will have to be made to meet the specific composition of the water in question. There



Square or Hexagon Stock Measuring from $\frac{1}{4}$ to $\frac{1}{2}$ In. and Flats from $\frac{1}{4} \times \frac{3}{8}$ to $\frac{1}{4} \times \frac{3}{4}$ In. Are Handled by This Motor-Driven Automatic Geared Straightening and Cutting Machine without Changing the Rolls

then passes through the stationary die and into the covered guide bar until it strikes a gage which has been previously set for the desired length. This contact starts the clutch mechanism and releases the feed, the cutting device coming into action at the same time. After the piece is cut off, the cover of the guide bar is raised automatically and the cut piece drops into the forked holders underneath. The return motion of the cutter starts the feed rolls in motion again and the cycle of operation is repeated until the entire coil has been cut.

are cements of both kinds which will resist certain acids and salts and others which will not, but expert opinion so far seems to be on the side of cement mixed with blast-furnace slag.

An exposition of safety and sanitation is to be held at the Grand Central Palace, New York City, Sept. 10 to 16, under the auspices of the National Safety Council and the American Museum of Safety. The exhibit will be held concurrently with the annual safety congress of the Council.

Steels Suited to Aeronautical Purposes*

Ordinary Carbon Best for Wire—Nickel Steels and the Corrosion Problem—Low Carbon Steel Cylinders—Armor Plate

BY G. A. RICHARDSON

IN considering steels available for aeronautical purposes, the subject logically divides itself as follows:

The requirements of structural parts and members, under which heading would come the consideration of stay wires, struts and body parts, etc.

Power plants and transmission parts.

Protective armor for military planes.

Aeronautical instruments and miscellaneous equipment.

In taking up each of the above mentioned divisions the following points must be taken into consideration:

Is the member or part subjected to considerable stress or strain?

Is minimum weight with maximum strength the only consideration? In some cases, notably engine parts, there is a minimum weight limit below which it does not pay to go. If an ordinary steel can be used just as satisfactorily, it is not economy nor is there any other advantage to be gained by using a higher grade material. In fact there are apt to be disadvantages.

Granting that lightness in weight is the important essential, what is the best material to use? Steel alloys that would be ideal under certain conditions may be impracticable because of difficulties encountered in fabricating. It may be that they will not draw well, that small sections cannot be satisfactorily made, that the expense of working up is prohibitive, or other similar reasons.

Where resistance to corrosion, ability to withstand sudden temperature changes without change, etc., are to be considered rather than other physical properties, a very different class of steel alloys comes up for consideration.

Last, is the manufacturer willing to stand for the extra cost, both of buying and manufacturing these special steels. As a general rule we might say that this was the least important consideration for it is taken for granted that in construction of this sort where so much, including human life, depends on every part standing up properly, the very best materials available are going to be used at all times. On the other hand, however, there are cases where an increase in weight, due to the use of common steels, might not be a serious drawback, owing to the use to which the machine is to be put.

Naturally more or less attention has been given to the subject of steels for aeronautical purposes, but we have run up against the same difficulties that many others have in attempting to correlate facts in regard to aeronautical practice. Owing to the lack of uniformity in aeroplane manufacturing methods, to the difficulty in obtaining experimental results, etc., our fund of data as directly related to aeronautical work is extremely meager and in many cases not in shape for giving out at the present time. For this reason I am approaching my subject in a suggestive manner, showing the various steels available, their suitability or adaptability for certain purposes and making recommendations based on intimate knowledge and wide outside experience in other directions.

Steels for Stay Wires

While one of the companies which I represent is a manufacturer of wire, only ordinary tonnage product is turned out and no attention has ever been given to the manufacture of the higher grades. It was a question with me as to whether I should omit this subject entirely or draw on the experience of others. For the sake of completeness I decided to do the latter, and I give some statements abstracted from the very interesting report contributed to the National Advisory Committee for Aeronautics (Report No. 3), by the John A. Roebling's Sons Company, Trenton, N. J. No company in the country is better qualified to report on this subject.

* Abstracted from a paper presented at the January meeting in New York of the Aeronautical Society of America. The author is with the Midvale Steel Company, Philadelphia, Pa.

The report covers the investigations made on aviation wires and cables, their fastenings and terminal connections. Much attention is given to the results of tests on the best forms of terminal connections which has some bearing on the quality of wire that can be satisfactorily used. It states that the original object in making wire for stays was to make it as strong as possible so as to reduce the weight to the greatest extent. This resulted in a wire so hard and strong that difficulty was experienced in forming the eye and bend for the terminal connection without breaking the wire. In subsequent developments the reaction carried the makers back to the use of wire which could be classed as soft. The final results of tests to date are that the best wire to use is that which is sufficiently strong and serviceable to permit of some reduction in weight but which combines with a high tensile strength, toughness and ductility as well. The company feels that there should be specifications for torsion and bending as well as for tensile strength. The report states that carefully made, high-grade carbon steel affords to-day the most reliable and flexible material for wire, cable and stays, possessing "the greatest strength for the least weight" known in the wire industry.

The Corrosion Problem

The fact that the mechanical properties of steel wire and cable are seriously affected by corrosion is so well known that it must be guarded against. As the damage done is a function of time as well as intensity of chemical or electrochemical action on the unprotected steel, "we have investigated the question of corrosion in the steel, itself, to as great a degree as possible. We have found that pure iron retards corrosion to a greater degree than the more impure steel—but we have also found that in highly attenuated filaments of the two metals, as in wire, the difference in rate of corrosion is practically negligible, especially when the total life of the wire, protected by an external coating such as galvanizing, is taken into consideration. We have found the use of special deoxidizers and cleansers questionable and have not adopted them."

Taking for granted, then, that ordinary carbon steels make the best stay wire, we find ourselves up against the proposition of properly protecting them against corrosion. There is probably no part of the machine where such protection is of greater importance. The Roebling Company says that hot galvanized, unwiped wire is undoubtedly the best but that very hard wires are likely to become brittle at the temperature of the hot galvanizing, and the next coating available is one of tin. Both of these should be protected by frequent applications of paint. Nickel plating is out of the question for wires to be bent or twisted, and, furthermore, it is injurious because of the electrochemical action which sets up between the steel and nickel at spots where the steel becomes exposed. Careful inspection from time to time is perfectly feasible if the above mentioned methods are employed, and they are undoubtedly the most satisfactory known to-day. The galvanizing or tinning should always be used in conjunction with a protective coating of paint and not by themselves.

Steel for the Struts and Other Sections

Owing to the position which the struts occupy they must at once embody great strength with as little weight as possible, and at the same time be so shaped as to offer a minimum resistance to the wind. If metal struts are to be used this means that a cold-drawn section undoubtedly represents the logical solution. Not only is

it possible to secure maximum strength with minimum weight, but desirable shapes can be made without difficulty. We have succeeded in cold drawing rounds in the straight nickel alloys running from 22 per cent nickel up to commercial nickel (98 per cent), and in addition have drawn chrome-nickel steel into rounds. Our experience has shown that careful annealing between passes is the most important consideration, and while we have experimented with nothing outside of rounds, we can see no reason whatsoever why chrome-nickel and some of the related steels cannot be drawn into other shapes.

As to the effect of cold drawing on the alloys, there is little doubt but that the operation should put the material in shape sufficiently satisfactory to eliminate the necessity of heat treating, if the annealing for cold drawing has been properly performed, though if desired this could be done afterward.

Apart from these special sections, about the only other structural members would be angles, tees, small channels or similar shapes which ought to cold-roll satisfactorily from the special alloys.

Inasmuch as all these parts are of such a nature that maximum strength with minimum weight is the essential feature, it would undoubtedly be better to use some of the chrome-nickel alloys having type compositions similar to the following:

Nickel, 3.5 per cent; chromium, 1.5 per cent; carbon, 0.35 per cent, or as desired.

Nickel, 3.0 per cent; chromium, 0.60 per cent to 0.90 per cent; carbon, 0.35 per cent, 0.50 per cent or as desired;

rather than high nickel steels, which would be more resistant to the effects of corrosion but are lacking in strength. Hence the question of protective coating would be much the same as in the case of the stay wires.

Material for the Motor

In the motor or engine there are several things to be borne in mind. On the one hand there is the desirability of using steels that do not corrode easily, that will not change excessively with changes in temperature and which can be worked up readily. On the other hand, however, it is necessary to use steels in such parts as the cylinders, etc., that will not be injured by overheating, a thing which is especially possible in the event of the cooling plant giving out. Then, too, structural requirements are such that saving in weight is often the least important consideration. We all know that certain portions of the power plant must be of a certain weight to give the best operating results. There is a minimum weight limit below which it is impracticable to go. As Professor Lucke of Columbia University has so clearly shown, the subject of thermal conductivity is of the greatest importance, though the question of providing enough metal to properly conduct the heat away in such important parts as the piston, valve discs, stems, etc., has not been given the proper consideration.

In too many cases the tendency of designers in their desire to reduce weights has been to cut down the section of operating parts to such a point that efficient operation is seriously interfered with. This is undoubtedly one of the reasons why aeroplane motors at the present time will not stand up as well in service tests as automobile motors. Granting that this is the case, it means that, inasmuch as there is nothing to be gained by too large a reduction in weight, it may be far more satisfactory to use a cheap steel than an expensive one, as it will possess sufficient strength and at the same time will be easier to work up.

At the present time we have received samples of French cylinders which seemed to have been cut out of solid, plain carbon steel, and not only this, but the quality of the steel is very poor. The carbon content runs 0.40 to 0.50 per cent. We know of a manufacturer in this country who is using hydraulic-forged cylinders made from 0.40 carbon steel which is slightly drawn to put it in the best possible condition. Our feeling has been that, while it is undoubtedly true that a medium carbon steel will possess sufficient strength for the purpose intended, there might be other compositions that would prove much more satisfactory because of their superior wearing qualities, and in special cases

where an excessive reduction in weight is deemed advisable. As a result we have out at the present time three samples of 25 per cent nickel steel, three of low-carbon (0.30 per cent carbon) Alpha steel and a similar number of No. 11 chrome-nickel steel.

The main advantage of using 25 per cent nickel steel would lie in the fact that it is extremely tough, possesses sufficient strength and at the same time wears well, or rather we should more correctly say that it does not wear at all because the surface glazes. This very reason for its wearing well brings in the disadvantage that it is difficult to machine. Low-carbon steel would also wear extremely well, is an extremely tough composition and would machine as readily as chrome-nickel. The chrome-nickel steel, on the other hand, was put out purely for experimental purposes, and it is questionable whether its disadvantages would not outweigh its advantages.

Low-Carbon Steel for Engine Cylinders

Professor Lucke of Columbia University states that he believes that the best engine cylinder to use is one of ordinary, comparatively low carbon steel, cold drawn to shape. By this method of manufacture a cylinder with uniform wall of desired thinness can be obtained, while at the same time it will possess the requisite toughness to enable it to stand up well. Not only this, but the material cannot be injured by overheating, and the composition is such that it will draw uniformly without leaving hard spots. He objects to the use of alloy compositions on the ground that they will be injured by overheating and that as the ordinary steel is sufficiently strong there is consequently no gain in their use. This objection is not to be met with in 25 per cent nickel or low-carbon steels, both of which will stand overheating without injury. This is especially true of the 25 per cent nickel.

It might be added that a little chrome in the 25 per cent nickel would materially help the elastic limit of the steel. Twenty-five per cent nickel is also quite resistant to corrosion and is non-magnetic. This latter feature, however, would be of little use unless the entire metal work of the machine was made of the same material, which is not feasible.

In the case of the piston, weight requirements and the necessity for sufficient section of metal to carry the heat off fast enough dominate. Saving in weight is very apt to be a disadvantage rather than an advantage. Another consideration is that the material should not warp or distort.

The Piston and Connecting Rods

Piston and connecting rods can follow automobile practice and be made of chrome-nickel steel of hollow or other section. Bearing parts, which must of necessity be of a certain size, are not to be considered in the question of reducing weight. Crankshafts may also be made of chrome-nickel alloy, though here it is necessary to keep within certain size limits to avoid whipping if a solid shaft is used. The modulus of elasticity (Young's modulus) is practically the same for all steels, and hence, as regards the amount of whip, it makes no difference what material is used. Where the design, therefore, calls for a certain size no matter what is used it may become quite possible that a cheaper steel can be introduced to good advantage. Camshafts may be made of hollow chrome-nickel steel, case hardened.

For valve parts we might recommend 30 per cent nickel steel because of its resistance to corrosion, low co-efficient of expansion and other physical properties, but we believe that its use has been discontinued by automobile manufacturers, and the majority are using carbon steel at the present time. Cams and tappets have been made of special alloys, but in one case that we know of the special alloys have been discarded because of the difficulty experienced in treating and machining and the fact that carbon steel seems to fill the requirements satisfactorily. The reason given for using the carbon steel in the tappets was that it was impossible to have the carbon steel and alloy steel rubbing together. Just why this should be so we cannot say, though it may be due to the difference in the expansion of the two compositions.

Unquestionably there are big advantages to be gained by the use of a metal propeller. Here, however, it seems quite certain that some of the aluminum alloys, which possess high strength and at the same time are light in weight, would be superior to any design calling for the use of steel or its alloys, owing to the fact that a solid section is desirable.

The design in the power and transmission plants should be made first, and then, if necessary, the elastic limit increased by the use of nickel or chrome-nickel. The use influences the question of design in many ways, especially in the case of pistons and cylinders. Actual practice has shown that cast iron on cast iron works best, cast iron on steel next, and steel on steel the worst of all. On short flights the engine and transmission part weights are of more importance than the amount of lubricating oil, and hence the reduction in weight gained by the use of steel on steel may more than compensate for the greater amount of lubrication required. On the other hand, in long flights the weight of the oil becomes the important factor, and an increase in weight due to the use of cast-iron cylinders and pistons will very likely be more than offset by the saving in weight of lubricating oil. Many other instances could be referred to, so that it can be seen that definite recommendations of any kind are hard to make that will cover all conditions.

The Question of Armor Plate

When it comes to the question of aeroplanes for military use it is of the greatest importance that measures be taken to protect the passengers and vital parts of the machine to as great an extent as possible by armor plate. It is impracticable to use armor plate of sufficient thickness to withstand all kinds of shell fire on account of the weight. On the other hand, however, it is possible to secure some remarkably satisfactory results with very thin plate.

The thinnest armor plate on which we have made any tests is made of a nickel-chrome composition and designed for use in helmets. The thickness of this plate is 0.039 in., which you can readily appreciate is very thin. Properly treated, this will stand up against the Colt .45 automatic service revolver at the point-blank range of 20 ft. A plate whose thickness is 0.2 in., made of a nickel-chrome-molybdenum composition, properly treated, will stand up against a standard Springfield rifle with U. S. standard service cartridge at a point-blank range of 60 to 70 ft. Sixty to 70 ft., in the case of the Springfield service rifle, is a much more difficult test than a shorter distance because of the fact that the bullet wobbles slightly when it first leaves the muzzle.

It will thus be seen that it is comparatively easy to protect the machine and occupants from revolver and rifle fire. The thin plate itself would give ample protection against rifle fire at long range. By using a little heavier plate still further protection could be given against shrapnel and bursting shell. As mentioned before, it would, of course, be impracticable to put on plate that will withstand solid shot, nor are the chances of being hit with solid shot very great.

General Conclusions

The following facts embrace the general conclusions of the points discussed:

That the use for which the machine is intended will play an important part in determining the kinds of steel.

That the design should precede the recommendation as to the steel used.

That if anything really worth while is to be accomplished by the use of special steels it will be necessary first to experiment to a much greater extent than has been done up to the present time, and, second, that standardization of practice will be an absolute necessity if costs are to be reduced to a reasonable figure. Where cold drawing or cold rolling is involved the cost of dies and rolls is too great to admit of meeting the ideas of every individual designer.

That the recommendations which I have made are largely suggestive rather than absolute and based on

our experience with the steels mentioned in other lines of work.

There must be better co-operation on the part of manufacturers of aeronautical supplies and equipment if valuable results are to be obtained.

Molybdenum in Canada

G. C. Mackenzie, of the Department of Mines, Ottawa, Canada, gave some interesting facts on the mining and metallurgical treatment of molybdenum to the Royal Canadian Institute, at its recent meeting in Toronto. Mr. Mackenzie related in a non-technical way the development of what is probably Canada's newest mining branch, and asserted that during the current year Canada will produce more of the mineral, which is of importance in the manufacture of steel, than Australia and Norway together. These two countries were heretofore the chief producers of molybdenum.

Deposits of the ore were uncovered in various parts of the Dominion—British Columbia, Ontario and Quebec. Then came an urgent demand from the Imperial Munitions Board for the mineral, and an agreement was reached between the Canadian Government and the Imperial Munitions Board, whereby the Department of Mines would act as purchasing agent for molybdenum. A sliding scale of prices was fixed according to the percentage of molybdenum in the ore, and the department began the work of concentrating the mineral. After considerable experimental work a machine was devised by the engineers of the Department for the separation of molybdenum from its gangue after it had been crushed, and it was found to be extremely efficient. The International Molybdenum Company, Orillia, Ont., was the first concern in Canada to go into the molybdenum business, and its activities in manufacturing by-products from the mineral met with complete success.

Fixture for Lighting Large Open Spaces

A lighting fixture which throws the rays downward has been developed by the General Electric Company, Schenectady. It was designed originally as a street

lighting unit for use in one of the suburbs of Buffalo, but, it is explained, can also be employed for lighting open spaces in industrial plants as well as at docks, lumber and railroad yards and the platforms at railroad stations. It is made in both the pole and pendant types.

The fixture is intended for use with a 100-cp. Mazda C lamp, although other sizes can be used. The rays that are thrown upward by the lamp filament are caught by a radial reflector and a prismatic band refractor and redirected outward and at a slightly downward



The Upward Rays of Light Are Collected by a Radial Reflector Which, in Conjunction with a Band Refractor, Serves to Redirect Them at a Slightly Downward Angle to Illuminate the Large Open Ground Areas Found in Industrial Plants

angle to illuminate the surfaces where light is needed.

The Vanadium-Alloys Steel Company announces that arrangements have been completed whereby the following firms will represent the company in the sale of its high-speed and alloy and carbon tool steels: E. T. Ward's Sons, 44 Farnsworth Street, Boston; Geo. Nash Company, 304 Hudson Street, New York; Field & Co., Inc., 721 Arch Street, Philadelphia, and Geo. Nash Company, 646 Washington Boulevard, Chicago.

A Special Double Grinding Machine

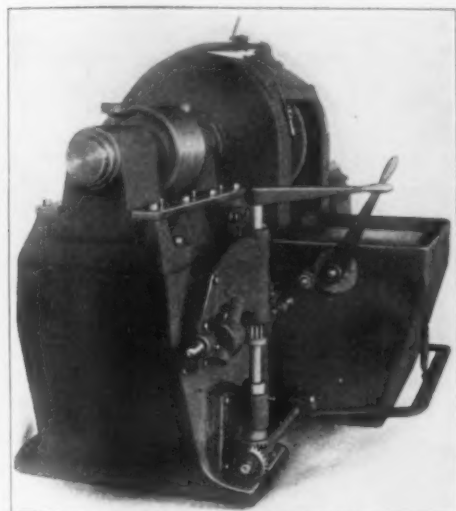
A new double-spindle grinding machine has been added to the line built by the Gardner Machine Company, Beloit, Wis. It is larger than those of the company's machines now on the market, mounting a 20-in. ring or a 24-in. disk wheel, as compared with 18 and 20 in. respectively which were the maximum diameters of wheels formerly handled. The two types of wheels are interchangeable. An interesting arrangement is employed for moving either of the wheels or both toward the center of the machine. When the disk wheels are being used the work is ground dry, but a complete water system is provided, thus making the machine available for wet grinding with ring wheels. A covered opening in the rear of the machine directly behind the sliding work table is provided for attaching to the dust exhaust system.

Each of the spindles, which are 3 in. in diameter by 37½ in. in length, is mounted in a sliding head. This in turn moves in a sub-base that can be firmly bolted in position on the main base of the machine. The sliding heads are covered by cast-iron hood ends fastened to the sub-bases and moving only when the latter are adjusted for position. The sliding heads work through

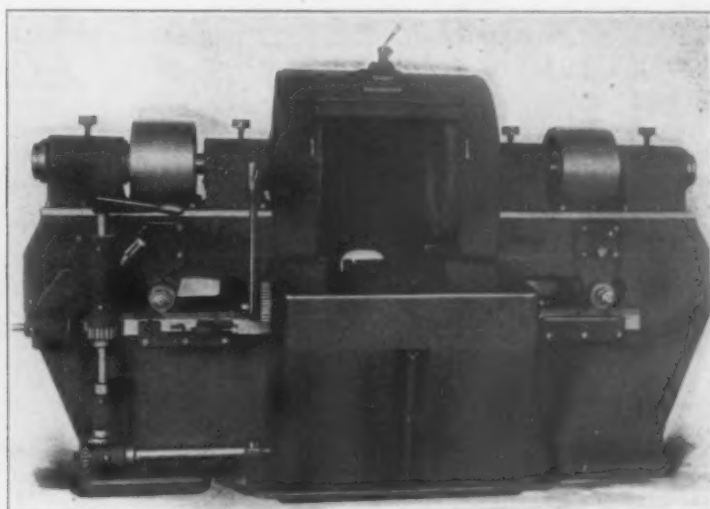
That on the left head is fastened in front of the center line of the head, while the rack on the other is attached back of the center, this arrangement being relied upon to cause the heads to move either toward or away from each other. The hand lever is connected to the treadle through bevel gears so that when the spindles start to revolve as the treadle is depressed the heads are fed toward each other. When pressure is removed from the treadle, a coil spring attached to it forces the heads back.

A micrometer stop screw is located at the extreme left of the machine in line with the feed bar. As the sliding heads move toward the center of the machine the feed bar moves to the left and bears against the micrometer screw. This is adjusted by a worm nut and is acted upon by a worm on the inclined shaft that terminates directly back of the hand lever in a small graduated handwheel. The back stop screw is located a little farther to the right and forms a part of the feed bar gib. A hardened block is attached to the feed bar and comes in contact with the hardened back stop screw, thus limiting the backward movement of the sliding heads. All of these gears and racks are covered when the machine is in operation.

The piece to be finished is mounted in its holding



The Wheels Are Fed by Manipulating the Long Horizontal Lever, the Movement of the Table Is Controlled by a Lever and Two Gears and the Spindle Is Operated by the Treadle



A Rack and Pinion Arrangement Provides Means for Moving the Wheels Toward or Away from Each Other for Grinding the Opposite Sides of Pieces of Different Widths, while the Backward Movement Is Checked by the Stops Shown at the Left

felt-lined holes in the hoods and have a combined lateral travel in the sub-base of 3½ in. which, it is pointed out, is more than is likely to be required in actual practice. The spindles are finished by grinding and are mounted in removable bronze bushings with babbitt lining. Each bearing is 10 in. in length and hardened and ground collars, 6 in. in diameter and 1 in. thick, are placed on the outer end of each spindle. In the illustration of the machine, the sub-bases are set for grinding opposite sides of very wide pieces, but it is explained that when parallel sides of narrower pieces are to be ground the sub-bases can be moved toward the center and bolted down. In adjusting the heads a wrench is placed over the pinion under the pulley which makes the adjustment easy. Emphasis is also laid upon the fact that the ways for the sliding heads are protected against grit and dirt by this hood construction.

The feed mechanism consists of a steel bar 3 in. square with a rack on its upper side. This is supported in ways at each end of the machine and extends practically across the entire front. A short rack on the front face of this bar at the left end engages with a pinion on the hand lever shaft. By pulling this horizontal lever to the right the feed bar moves in the opposite direction and causes the two feed pinions to turn in opposite directions. These gear shafts have bevel pinions which mesh with a gear on the bottom end of the vertical shaft mounted in the sub-bases. At the upper ends of these shafts pinions are fastened that mesh with racks attached to the under side of the sliding heads.

fixture on the sliding work table in the center of the machine, the whole combination being moved in or out between the grinding wheels by a hand lever, pinion and rack attached to the under side of the table. Ordinarily the larger of the gears is the driver, but when a slower and more powerful stroke is required it is pointed out that the gears may be reversed. The shaft carrying these gears extends across and underneath the sliding table to the other side of the machine, thus enabling the operator to handle the work from that position.

The base of the machine is cored out, thus giving a capacity of approximately 70 gal. of water or grinding compound. The over-all dimensions are 95 in. in length and 51 in. in width. The net weight is 5000 lb.

On Feb. 15 the Rider-Ericsson Engine Company was reorganized with Samuel Andrews, president; A. W. Christianson, vice-president and general manager; Sanford Abrams, treasurer, and D. C. Dominick, secretary. All are thoroughly familiar with the requirements of the trade. Plans have been made to extend the business of the company materially. The company's products are the Reeco water supply systems, consisting of power pumps, gasoline and kerosene engines and pumps, electric pumps, hot-air pumping engines, towers and tanks, and pneumatic tanks and electric lighting plants. Stores are located at 20 Murray Street, New York; 239 Franklin Street, Boston, and 40 North Seventh Street, Philadelphia.

See No Reason for Change in Rail Design

Thorough Trial of Quick Bend Test of Rails Recommended by Committee Re- port to Railroad Engineers at Chicago

The eighteenth annual convention of the American Railway Engineering Association was held at the Congress Hotel, Chicago, March 20, 21 and 22. The threatened railroad strike and the fact that many members found it necessary to attend the hearing on valuation principles before the Interstate Commerce Commission at Washington operated to keep many away from the convention, and the attendance was somewhat smaller than it has been in recent years. The registrations at the close of the second day totaled 429. The total membership is 1370, an increase of 33 per cent in 5 years.

The following officers were elected for the ensuing year: President, John G. Sullivan, Canadian Pacific, Winnipeg; first vice-president, C. A. Morse, Chicago, Rock Island & Pacific, Chicago; second vice-president, Earl Stimson, Baltimore & Ohio, Baltimore; treasurer, George H. Bremner, district engineer, division of valuation, Interstate Commerce Commission, Chicago; secretary, E. H. Fritch. Directors, J. A. Atwood, Pittsburgh & Lake Erie, Pittsburgh; W. H. Courtenay, Louisville & Nashville, Louisville; L. A. Downs, Illinois Central, New Orleans.

A. Stuart Baldwin, retiring president, said in his opening address that the standards and specifications adopted by the association, and contained in its manual, were exerting a powerful influence toward a unification of railroad practice, and that the specifications for steel railroad bridges of the Committee on Iron and Steel Structures had not only been widely adopted throughout this country but had been translated into Spanish by Argentina and published in the official bulletin of the department of public works of that country. He stated, also, that the Joint Committee on Stresses in Railroad Track had obtained contributions aggregating \$7,500 from the Bethlehem, Cambria and Lackawanna steel companies, each giving \$2,500, to be devoted to research work along the lines of the work of the committee. He emphasized that at no time in the history of the country had the labor situation been so uncertain and precarious and declared it behooves the railroads to go about their work as quickly as possible as there is promise of an unprecedented competition for labor as the season advances. In commenting on a statement by former President Taft bearing on the inadequacy of our railroad system to meet the requirements of a state of war, Mr. Baldwin said:

It is alleged that the organization and transportation of 150,000 troops to the Mexican border required about six weeks, whereas Germany and France had several millions of men assembled on their frontier within eight days, and Switzerland threw 400,000 troops to her borders within 24 hr. Our country is rapidly awakening to the importance of this matter. We cannot know when, if at all, the crucial test may come, nor can anyone surmise what sections, if any, may be called upon to bear the heat of conflict, but it behooves the engineering departments of the railroads to inform themselves regarding the possible requirements so as to be prepared to meet any conditions that may arise. Engineers who are eligible should be encouraged to join the engineer officers' reserve corps, and the requirements of the service in case of a war should be the subject of study and conference as an operating feature of railroads.

No Change in Rails Favored

The Committee on Rails reported that its investigations had disclosed no good reasons for making any changes in the rail designs which were adopted in 1915, although twice since their adoption criticism had come from the Manufacturers' Rail Committee. The latter body protested that treating the rail as a girder and securing the highest ratio of section modulus to area of section, leads to an increase of failure of such rails in detail. The Manufacturers' Committee also main-

tained that it preferred designs which will give greater strength to resist types of failure which are prevalent. The Committee on Rails asked for definite statistics confirming the contentions of the manufacturers, but, as these had not been received, no changes along the lines suggested were thought advisable. During the year several special reports have been presented to the committee, all of which have appeared in bulletin form. The committee reviewed these reports.

From a bulletin issued in August, 1916, the following figures and comment relating to failures per 100 miles of rails laid are taken:

Rail Failure Statistics

"The average failures per 100 track miles of the rollings for the several years, including both the Bessemer and open-hearth rails, are given in the following table:

Year Rolled	Year's Service				
	0	1	2	3	4
1908	.....	.....	.....	.....	398.1
1909	.....	.....	.....	.....	277.8
1910	.....	.....	.....	124.0	152.7
1911	.....	.....	77.0	104.4	133.3
1912	.....	38.9	43.1	49.3	.....
1913	2.0	12.5	25.8	.....	.....
1914	1.2	8.2	.....	.....	.....
1915	0.7	.....	.....	.....	.....

"It will be noted that the 1908, 1909 and 1910 rollings show successively decreased numbers of failures compared on a basis of five years' service and the later rollings also show successive reduction in failures when compared on a less number of years' service. A study of the results shows this to be due partly to the gradual replacement of Bessemer by open-hearth rails and partly to improvement in both."

Quick Bend Test Recommended

The Committee on Rails, in conjunction with the Manufacturers' Rail Committee, has under consideration the quick bend test as a substitute for the drop test for rails. A committee on Rail Tests made an exhaustive investigation of the relative merits of the two tests with the result that the following recommendations were made:

1. The possibilities of this test as a means of securing a more durable steel with the proper toughness we believe is of sufficient importance to warrant making the quick bend test in conjunction with the drop test on this year's rolling of rails, and we would so recommend.
2. We recommend that the manufacturer at each mill be requested to co-operate with us in these tests, to be based upon the attached revision of the present rail specification. This in order that they may learn with us what the substitution of this test for the present physical requirements would mean to them in a more uniform product and one more nearly meeting the requirements of our service. We offer this substitute specification subject to such revision as may be developed, based upon the trial suggested in our first recommendation.
3. We suggest that a certain proportion of each mill's rolling, which indicates, from the results of the quick bend test, good and poor wearing qualities, should be placed in service under observation, to determine if our analysis of the test data is confirmed by the service which the steel gives in the track.

Rail Failure Situation

The report of the Committee on Rails stated that a paper entitled the "Rail Failure Situation," by M. H. Wickhorst, engineer of tests, Rail Committee, presents the conclusions that may be drawn at the present time from the investigations the committee has been making in the past few years. His paper treats quite exhaustively the various classes of rail failures and their causes as far as ascertained, with the following conclusions and suggested remedies:

From this discussion it may be gathered that there are two general causes for rail failures, so far as the rail itself is concerned, as follows:

1. A defective condition of the interior of the upper part of the ingot, such as segregation of carbon, phosphorus and sulphur, blowholes and slag, causing split heads and fissures.
2. Seams in the bottom of the base, causing broken bases and broken rails.

Efforts to improve the rail must, therefore, in general, take two different directions, one to improve the top part of the ingot or not to use it for rails, and the other to avoid having seams in the bottom of the base.

The service required of the rail has continuously grown more severe since the time that railroads were first built, and the time has probably arrived when the upper 25 or 30 per cent of the ingot as ordinarily made can no longer be considered suitable for rails intended for heavy service. Two courses seem to be open, as follows:

1. Make the ingots in the ordinary manner and cut off from the top end of the bloom the equivalent of 25 or 30 per cent of the weight of the ingot, or, in other words, make a top discard of 25 or 30 per cent. This top part may then be used for other purposes, or it may be remelted.
2. Make the ingots by some form of "hot top" process in which the top of the ingot is kept liquid, to feed to the shrinkage space that would otherwise form a pipe. With such a process the harmful segregation can be kept in the upper 10 per cent of the ingot and full advantage can be taken of the benefits of quiet setting steel effectively deoxidized.

Which procedure is best will depend on the local conditions of the steel plant and the kinds of other products made.

It has sometimes been stated that rails break because they are too light, and that therefore their weight should be increased, including the weight of the head. There is, of course, an advantage in heavy rail as regards smooth riding track and ease of maintenance, but the weight of the rail can be considered only a minor factor as regards head failures. The primary cause of head failures must be considered to be a defective internal condition. This would not be bettered by an increase of weight, nor would the strength of the rail to resist head failure be materially increased by an increase in the weight of the head.

A further development is also needed in our rail specifications. The drop test is primarily a test for ductility and should be used to safeguard as far as possible the ductility of the metal in the interior of the head. For this reason the rail should be tested in the drop test, with the head down, so as to get this part in tension and to more effectively detect excessive interior segregation than when tested with the base down.

We now come to the other general cause of rail failures, namely, seams in the bottom of the base. Roughly, about half the rail failures are traceable to the interior condition of the ingot and the other half, or most of them, are traceable to base seams. The deep seams probably originate mostly from tears in rolling the ingot into the bloom, starting in turn from cracks in the surface of the ingot, but we are very lacking in definite information as to the exact influence of the several conditions that may affect the rolling, such as the condition of the mold, the temperature of the ingot, the method of heating the soaking pits, the amount of draft in making the bloom, the forms of the shaping passes, etc.

With the older thin-base sections a seam in the bottom of the base is specially harmful, and probably the chief merit of the thick bases of such sections as the A. R. A. sections, is the increased strength of the base to resist failure by the opening up of a seam, although originally designed to provide more uniform finishing temperature throughout the section. More recently, also, the fillet between the web and the base has been increased in some rail sections to afford additional strength against broken rails. From the manufacturing standpoint, the Lackawanna Steel Company several years ago devised a deseamer, a machine for milling the surface from the hot bar before fully formed into rail, thereby removing most of the defects from the bottom of the base of the rail.

Besides the elimination of seams, we also have the

problem of increasing the transverse ductility of the base, which is generally both low and irregular. When a rail is supported near the edges of its flanges and loaded on top so as to stretch the bottom of the base crosswise, it generally stretches only about 1 per cent or less before breaking, and only occasionally does a sample give an elongation over 3 or 4 per cent. Research should be directed toward regularly producing rails that will give a ductility of not less than, say, 4 or 5 per cent transverse stretch at the bottom of the base. We also need some kind of a proof test to which each rail could be subjected for the purpose of eliminating the rails which contain dangerous seams in the bottom of the base.

Having obtained a sound rail, free from defects, it behooves the railroad to maintain the track and joints in a careful manner in order to obtain the best results from the rail.

Contemporary Meetings

In conjunction with the convention of the American Railway Engineering Association, the Railway Signal Association held its spring meeting, and at the Coliseum was the usual exhibit of the National Railway Appliances Association. The exhibit was particularly comprehensive. The exhibiting firms and companies totaled 161, against 143 last year. On Friday over 300 delegates went to Gary, Ind., and Buffington, Ill., to inspect the plants of the Illinois Steel Company, the American Bridge Company and the Universal Portland Cement Company, these companies being the hosts.

Annealing Metal of Thin Gages

Care must be taken in annealing metal of thin gages, according to the "Waterbury Book of Alloys," to see that the coils are not wound too tightly before being placed in the furnace. The coil should be loosened as if it is annealed just as it comes from the winding machine it will sweat in the furnace and the surfaces of the metal will stick together. Among the methods recommended for loosening the coil is to place it upon a smooth surface, such as a sheet of brass or iron, and loosen it by unwinding. Another plan is to place the bottom of a tapered brass kettle inside the coil and make the metal bite around on it. The kettle is then turned by hand and the metal wound upon it, thus loosening the coil and after the operation has been completed the kettle, owing to its shape, may be removed easily. Other methods employ a round block of wood fitted with a handle set at right angles to its sides, upon which the metal is wound and unwinding by hand. With this last method the start is made from the outside of the coil by making it 4 or 5 in. larger in circumference and turning until all the layers of metal have been moved.

Large Gyratory Crusher

What is said to be the largest gyratory crusher ever built has been installed at the plant of the Michigan Limestone & Chemical Company, Calcite, Mich. It was built by the Kennedy-Van Saun Mfg. & Engineering Corporation, 120 Broadway, New York City, and is rated at approximately 25,000 tons of limestone per 20-hr. day. The crushing space and the receiving hopper have a capacity of over 65 tons of stone, which is crushed to a maximum size of 8 in. The over-all height of the machine is 34 ft., and some of the parts were so large and heavy that they could not be shipped in one piece, but had to be put together at the point of installation. The crusher is driven by a 1½-in. Manila rope running over a cast-steel sheave 66 in. in width, having 18 grooves machined in its face. The English system of drive is used, the power being supplied by a 300-hp. motor.

In connection with a description of a rectifier for automobile charging developed by the General Electric Company, and illustrated in THE IRON AGE, March 22, on page 703, some figures on the cost of charging were given. It appears that these costs should have been for a charge of approximately 13 hr., and not per hour.

An Automatic Profile Shaping Machine

The Luster-Jordan Company, Inc., Norristown, Pa., has brought out an automatic machine for use in the production of blanking dies. Among the plants in which the machine is intended to be used are shops producing hardware specialties, drop forgings, locks, automobile and carriage lamps and fixtures, adding machines, etc. The special features of the machine are the universal table upon which the work is clamped and the use of a tool formed from a piece of ordinary round drill rod.

The table, which has a working surplus of 8 x 22 in., slides on the bed on three self-aligning roller bearings and is counterbalanced by weights which press it toward the cutting tool. A three-fold motion—transverse, longitudinal and revolving—is provided for the table, which will revolve either concentrically or eccentrically with the machine, it being thus possible to get an oval motion of 6 x 12 in. by adjusting the table. The circular motion of the table is 8 in. A brakeshoe on the upper part of the ram automatically locks the table at the completion of every upward stroke of the tool. It operates by friction to move the eccentric lever on the left side of the machine and is relied upon to press the gib of the table tight so that the latter cannot move when the tool is cutting on the down stroke. After the cut has been finished upon the completion of the down stroke, the brakeshoe is automatically released by the ram, thus permitting the table to slide back for the next cut.

A piece of ordinary round steel drill rod milled in the center to a triangular shape is ordinarily employed for the cutting tool. The cutting edge is obtained by recessing the lower part the distance equal to the depth of the cut desired. The tool is inserted in the ram of the machine and is guided by the supporting arm of the machine at the top. This arm swings on a hinge to facilitate the removal of the tool. The stroke of the machine, which ranges from $\frac{1}{4}$ to 6 in., is adjusted so that at the highest position of the ram the cutting edge of the tool is between the templet and the die. The tool works up and down as on a vertical shaping machine and will cut the die until the upper portion of the tool that serves as a guide strikes the templet which is, of course, the finishing line of the die. In this way it is pointed out that the tool will not cut farther than the templet and consequently spoiling the die is avoided. Two locks on the ram provide a ready means for adjusting the stroke of the tool without requiring the operator to leave his working position at the front of the machine.

In operation an exact templet of the die is made

from $\frac{1}{8}$ -in. sheet steel and the outline hardened. After the templet has been made the die is roughed out to give a space for the tool to pass through. The die blank is next placed in the machine with the templet on top, a space of about $\frac{1}{4}$ in. being left between the two to



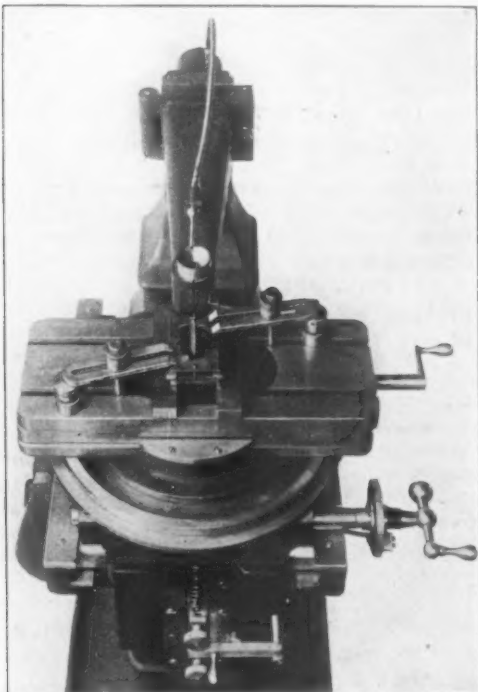
Blanking Dies Are Finished by Using a Piece of Drill Rod Ground to a Triangular Cross-Section with the Apex Recessed Slightly to Form a Cutting Edge

serve as a clearance for the tool. The die and the templet are fastened by two clamps which can be adjusted to take care of variations in the thickness of the die.

The machine is driven by a two-step cone pulley and a friction clutch, a quick return being provided for the up-stroke of the tool. The power required to drive the machine is approximately 2 hp. and the floor space required measures 28 x 38 in.

Deoxidizer for Brass Castings

The S. Obermayer Company, Pittsburgh, through E. D. Frohman, is putting on the market a deoxidizer for use in cleaning brass castings, known as the Rillton brass cleaner. With brass melted by the flame-type furnace, the purifier is placed in the bottom of the ladle, 1 lb. to about 500 lb. of molten metal. In using the purifier with brass turnings and scrap, before charging into the furnace or crucible, the company states that about 2 lb. of purifier to 500 lb. of metal should be used. When ingot metal is used, the company recommends that an additional 1 lb. of cleaner to 500 lb. of metal be used in the furnace after the metals have melted. The company states that the use of the Rillton cleaner will decrease the oxides in the skimmings from an average of 20 per cent to about one-half of 1 per cent. It is claimed the cleaner is particularly desirable for use in castings which are subject to hydraulic test.



The Enlarged Upper Portion of the Cutting Tool Striking the Templet Is Relied Upon to Prevent Overcutting and Consequent Spoiling of the Die

The Pacific Concrete Pipe Association, after a three-day convention in Portland, Ore., recently, the first gathering of cement pipe men ever held in the Pacific Northwest, formed a permanent organization, with the following officers: C. H. Ballen, Portland Cement Pipe & Tile Company, Portland, president; George Scofield, Savage-Scofield Company, Tacoma, vice-president; H. W. Shaw, Harbor City Cement Company, Everett, Wash., secretary-treasurer. Pipe manufacturers from all parts of Oregon, Washington, Idaho and California were in attendance. The association plans to standardize concrete sewer, culvert and drain pipes, and manufacturers will be asked to bring their product up to association specifications.

Sand-Blast Room with Health Features

Preventing the operator from coming in contact with the blast or with the dust is a feature of a sand-blast apparatus developed by the American Foundry Equipment Company, Cleveland. It is a refinement of the rotary table room brought out a few years ago by this company, which required a man on the inside to direct the blast and turn the work over, while in the newer one he works on the outside of the room but may view the work through a fine mesh screen of copper wire gauze. In this way the health of the operator is conserved.

The equipment consists essentially of the company's standard rotary table unit in which the regular room is replaced by a semi-circular casing with a portion of the top cut off at an angle and covered with the wire screen. About 3 ft. from the floor is an opening covered with a piece of rubber that is split horizontally. The sand blast nozzle is inserted through this, it being possible for the operator to move his hand up and down or from side to side without allowing the sand to escape. Two special lamps in the room provide illumination and the operator can see the condition of the work by looking through the wire screen, as stated. The table has a diameter of 5, 6 or 7 ft. and is provided with openings on the surface through which the sand falls into a recovery tank located in a pit under the room. From this tank the sand is discharged by

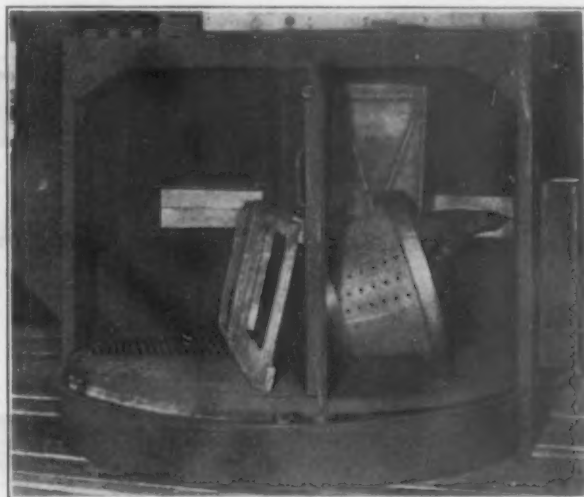
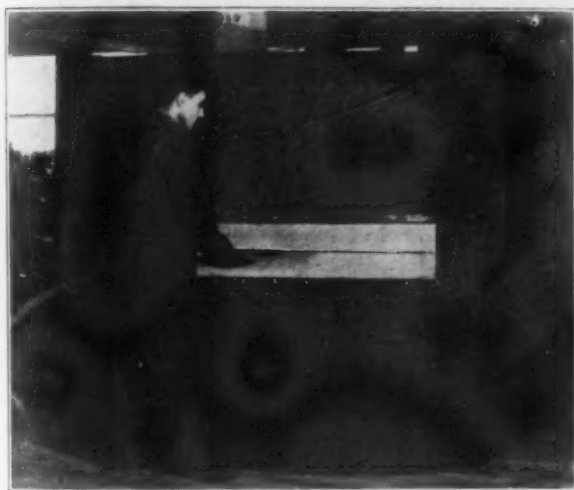
Activities at Camden Shipyard

The New York Shipbuilding Corporation, Camden, N. J., on account of the large number of orders already under construction in its yards, is extending its building capacity to provide additional space for the proper handling of the construction of the battleships Colorado and Washington. Contracts have already been let for two new slips, each 152 x 973 ft. The capacity of the yard will be increased about 50 per cent.

Part of the increased building space will be utilized for constructing four standard freighters, two of 5550 tons and two of 4000 tons deadweight capacity each, which it is building for its own account. It expects to have these four vessels completed within a year, because they are types which have been built many times in the yard, and no duplication of molds, patterns, or specifications is necessary.

The extreme scarcity of ships has made it profitable to follow this method of financing construction, as the ships, when completed, or even when partially completed, command proportionately better prices than are commanded by contracts for delivery at distant future dates. Japanese shipyards, notably the Kawasaki and the Mitsubishi yards, have been building and selling for their own account through the past two years.

Four other steamers have recently been laid down in the Camden yards: two passenger and freight steamers for W. R. Grace & Co., and two freighters for the



The Operator Inserts the Nozzle Between Two Strips of Heavy Rubber and Watches the Progress of the Sand-Blasting Process Through a Screen of Copper Wire Gauze at the Upper Portion of the Front Wall, the Rotary Table Being Loaded and Unloaded at the Back in the Meantime

gravity into the sand-blast line and is conveyed to the nozzle by air pressure, which also regulates the admission of sand to the line.

While one or more castings are being cleaned on one half of the table, those already cleaned may be removed from the portion of the table projecting from the back and be replaced with others, thus making the operation practically a continuous one. The operator may, of course, load and unload the table if desirable, as he works entirely outside of the blast area and does not wear helmet, coat, gloves or respirator and consequently is not encumbered in the performance of this work any more than the laborers generally employed for handling castings.

The castings for which this room is recommended by the maker are those which are not intricately cored and do not require more than one or two turnings to expose all sides to the blast, it, of course, being necessary that the castings be heavy enough to remain on the table when the blast is turned on. Castings with heavy recessed cores which in direct blasting would blow back into the operator's face in clouds can also be handled easily with this machine, it is emphasized, since the operator can work directly against the opening and still be protected from the dust of the core. An exhaust fan connected with the room draws air in through the screen in the upper portion of the front wall, thus, it is pointed out, keeping that free from dust and giving the operator a clear view of the interior.

International Mercantile Marine. The Grace steamers are oil burners of about 5000 gross tonnage. Their length is 375 ft.; beam, 51½ ft.; depth, 33½ ft.; draft, 24 ft., and speed, 14 knots loaded. The steamers building for the International Mercantile Marine are said to be destined for use by the Atlantic Transport Company. They are freighters of 10,000 tons deadweight capacity, 430 ft. in length, with 56-ft. beam and 27 ft. 10 in. draft. They will make 11 knots when loaded.

Dutch Organization to Buy Steel

The Co-operative Purchasing Society of Manufacturers of Metal Products was organized in Holland late in January. It is comprised of thirty-eight large firms operating machinery plants, shipyards, etc., which in the aggregate use by far the greater part of all the iron and steel imported into Holland. It is stated that supplies of iron and steel have hitherto come almost entirely from Germany and England, but that lately receipts have been far from sufficient. The firms turn to the United States for relief and desire to form connections at once with American iron and steel producers, according to U. S. Consul Frank W. Mahin, Amsterdam, Holland.

In line with the growth of its business, the Federal Export Corporation, 115 Broadway, New York, has established branches at Santiago, Chile; Buenos Aires, Argentina, and Capetown, South Africa.

Loss in Exports Less Than Anticipated

February Shipments Decline Only 24
Per Cent as Result of U-Boat Activities—
Material Gains Over Last Year Recorded

WASHINGTON, D. C., March 27, 1917.—While the effect of Germany's submarine campaign begun on Feb. 1 is clearly apparent in the official statistics of our foreign commerce for that month, the loss is much less than was anticipated. Estimates made early in March foreshadowed a decline in general exports of at least 50 per cent, but the official figures show a loss in February as compared with January of but 24 per cent,

Exports of iron and steel by values during February declined but 21.5 per cent, as compared with January, or slightly less than general exports, the difference being attributed in part to higher prices, but also to the special efforts made by representatives of the Allies to make shipments of war material without regard to the risks involved. The total for February exceeded by 57 per cent that of the corresponding month a year ago, and surpassed by a substantial margin the average of the last six months of the calendar year 1916.

Shipments of tonnage commodities, while showing a gain of 22 per cent as compared with February, 1916, declined 26 per cent from the total of January of this year and 30 per cent from the high record of last September. It will be noted that the loss in tonnage commodities as compared with January exceeded the decline in general exports, but a partial offset is found in the exports of machinery which, showing a gain of 33 per cent, compared with February, 1916, declined but 22 per cent as compared with January of this year. Shipments of machine tools in February rose 42 per cent, compared with the same month a year ago, but declined 20 per cent, as compared with January, and 33 per cent from the high record of May, 1916.

For the eight months ended February the total exports of iron and steel surpassed by 95 per cent the corresponding period of 1916. Shipments of tonnage commodities gained 53 per cent; machinery, 56 per cent and machine tools, 83 per cent.

The value of all shipments of iron and steel products in February, 1917, was \$85,117,010, as compared with \$54,155,386 for the same month of 1916, and \$108,423,640 for January of this year, when high-water mark was reached. For the eight months ended February, 1917, the total was \$689,691,291, as compared with \$355,120,855 for the same period of 1916, which was an advance of more than 100 per cent over any previous corresponding eight months.

taking no account of the fact that in February there were but 23 working days as against 26 in January. As each day represents roughly 4 per cent of the month, it is apparent that the actual decline in exports based on the daily average was only about 14 per cent.

Exports of Iron and Steel

	February		Eight Months	
	1917, Gross Tons	1916, Gross Tons	1917, Gross Tons	1916, Gross Tons
Pig iron	49,018	15,061	572,005	171,708
Scrap	28,174	9,371	165,055	84,866
Bar iron	2,904	5,174	42,040	41,586
Wire rods	5,544	13,764	89,716	111,819
Steel bars	44,544	53,894	509,603	371,125
Billets, ingots and blooms, n.e.s.	131,566	87,306	1,225,682	506,461
Bolts and nuts	1,714	2,735	19,658	21,497
Hoops and bands	2,673	4,559	28,646	27,137
Horseshoes	161	958	3,078	9,876
Cut nails	167	176	3,320	2,944
Railroad spikes	2,639	4,160	12,866	16,657
Wire nails	5,707	9,522	90,901	77,016
All other nails, including tacks	1,988	456	11,930	6,644
Cast-iron pipes and fittings	5,211	4,841	51,032	34,027
Wrought pipes and fittings	8,231	6,783	121,796	84,427
Radiators and cast-iron house heating boilers	516	195	2,140	1,702
Steel rails	46,153	34,630	421,864	371,817
Galvanized iron sheets and plates	5,455	5,537	60,505	50,402
All other iron sheets and plates	2,776	4,605	29,790	27,013
Steel plates	26,395	19,272	217,299	190,260
Steel sheets	6,031	8,079	71,806	61,546
Structural iron and steel	28,306	18,880	230,176	180,304
Tin and terne plates	14,632	13,534	142,591	133,389
Barb wire	16,460	29,577	247,449	222,617
All other wire	12,139	15,751	167,961	156,955
Total	449,104	368,820	4,538,909	2,963,855

Exports of Machinery

Exports of machinery in February were valued at \$18,586,903, as compared with \$13,945,347 for the same month of 1916. August still leads in the exports of

Exports of Machinery

	February		Eight Months	
	1917	1916	1917	1916
Adding machines	\$136,778	\$97,707	\$998,055	\$536,862
Air-compressing machinery	63,591	42,027	750,534	348,724
Brewers' machinery	2,401	179	8,030	19,784
Cash registers	75,757	70,259	1,032,624	802,862
Parts of	9,291	2,156	92,399	70,674
Cotton gins	4,813	16,893	79,087	55,458
Cream separators	48,889	71,376	209,596	328,855
Elevators and elevator machinery	158,732	72,343	1,346,572	858,142
Electric locomotives	128,481	134,405	447,329	379,592
Gas engines, stationary	107,568	25,026	398,136	223,267
Gasoline engines	1,284,712	880,490	9,705,150	5,303,948
Steam engines	1,281,548	280,207	9,066,401	11,428,888
All other engines	364,739	371,480	2,658,729	1,196,645
Parts of	1,418,220	537,457	13,424,126	4,255,179
Laundry machinery, power	21,972	10,959	207,962	166,402
All other	28,410	26,512	229,201	195,186
Lawn mowers	12,565	26,317	108,885	120,793
Metal-working machinery (including metal-working tools)	6,642,827	4,662,905	55,300,587	29,859,822
Meters, gas and water	11,187	24,565	238,751	165,047
Milling machinery (flour and grist)	22,739	196,046	825,089	1,780,488
Mining machinery, oil well	44,982	128,180	1,367,028	785,711
All other	909,002	507,528	6,337,137	4,275,133
Paper-mill machinery	84,952	81,316	1,178,721	654,735
Printing presses	92,127	130,703	1,310,703	1,001,855
Pumps and pumping machinery	375,761	400,106	3,964,312	2,919,467
Refrigerating and ice-making machinery	50,285	54,358	503,913	484,842
Sewing machines	486,580	501,920	3,791,944	3,594,626
Shoe machinery	108,022	98,373	848,600	926,761
Sugar-mill machinery	514,224	275,648	8,999,209	5,177,739
Textile machinery	193,022	188,929	2,351,414	1,405,803
Typesetting machines	101,797	88,351	733,013	414,161
Typewriting machines	616,767	799,375	7,456,565	5,453,541
Windmills	30,843	76,255	496,452	630,527
Wood-working machinery, saw mill	27,849	32,426	311,796	203,714
All other	73,390	55,861	642,994	762,491
All other machinery and parts of	3,052,080	2,976,709	27,906,106	19,601,723
Total	\$18,586,903	\$13,945,347	\$165,317,150	\$106,389,447

machinery with a total of \$24,657,597. Shipments of metal-working machinery in February aggregated \$8,642,827, as against \$4,662,905 for the same month of 1916. May, 1916, holds the record in exports of metal-working machinery with a total of \$9,835,806. Exports of machinery of all kinds for the eight months ended February, 1917, were valued at \$165,317,150, as compared with \$106,389,447 for the corresponding period of 1916, which was the record total for the eight months. Details of the exports of machinery for February, 1916 and 1917, and for the two eight months' periods, are given in the accompanying table.

Exports of Iron and Steel

The exports of iron and steel for which quantities are given aggregated 449,104 gross tons in February, 1917, as compared with 368,820 tons in the same month of 1916. Maximum exports of these commodities were recorded last September when the total was 643,763 gross tons. The shipments in January of this year aggregated 608,286 gross tons. For the eight months ended February, 1917, the shipments were 4,538,909 gross tons, as compared with 2,963,855 tons for the same period of 1916. An accompanying table shows the exports for February and for the eight months ended February, 1917, as compared with 1916.

Imports of Iron and Steel

The imports of tonnage iron and steel in February gained about 20 per cent over the same month a year ago. A heavy increase is recorded in imports of scrap, while there was a marked decline in the receipts of billets. Ferromanganese, which was included with "all other pig iron" in February, 1916, now appears as a separate item. The total receipts of tonnage iron and steel in February aggregated 24,378 gross tons as com-

Imports of Iron and Steel

	February		Eight Months	
	1917	1916	1917	1916
	Gross	Gross	Gross	Gross
	Tons	Tons	Tons	Tons
Ferromanganese	6,379	.....	55,735	.....
Ferrosilicon	572	533	4,647	3,042
All other pig iron	306	9,642	30,907	73,993
Scrap	15,923	5,052	130,354	75,986
Bar iron	95	206	3,990	5,009
Structural iron and steel ..	12	192	676	932
Hoop or band iron .....	.....	.....	.....	470
Steel billets without alloys ..	475	2,261	4,268	5,720
All other steel billets	230	908	8,774	6,298
Steel rails	240	762	10,836	39,187
Sheets and plates	111	167	1,205	1,120
Tin and terne plates	35	107	553	450
Wire rods .....	.....	449	2,063	3,024
Total	24,378	20,279	244,008	215,231

pared with 20,279 tons for the same month of 1916. The imports for the eight months ended February, 1917, were 244,008 gross tons, as compared with 215,231 tons in 1916. The accompanying table shows the imports of tonnage commodities for February, 1917, and for the eight months ended February, as compared with 1916.

Our Exports of Aeroplanes

The record year in aeroplane exports from the United States was 1915 when 397 machines were exported. The number in 1914 was 40, but in 1916 it had dwindled to only 14. In 1913 only 13 were exported. In exports of parts of aeroplanes, however, the data are decidedly different. In 1914 the valuation of exports of parts was \$145,997, which grew to \$2,458,492 in 1915 and expanded still further to \$3,753,967 in 1916.

The Bradford-Ackermann Corporation, recently organized, has established headquarters in the Forty-second Street Building, New York, and will act as manufacturers' representative. The president, C. C. Bradford, who was formerly sales manager of the United States Light & Heating Corporation, is a graduate of Case School of Applied Science, Cleveland, and Mr. Ackermann is also technically trained. In connection with their sales efforts, they will give engineering service, and the corporation will assume full responsibility for accounts created by it.

Waste Material Dealers' Banquet

The growth of the National Association of Waste Material Dealers was strikingly manifested at the banquet held at the Hotel Astor, New York, on the evening of Wednesday, March 21. The association is only four years old, but within that time it has extended its membership all over the United States and numbers a large proportion of the most prominent dealers in the trade. The great North Ball Room of the hotel was filled to overflowing on this occasion, and the representation was of a character to rank with any corresponding assemblage of trade organizations in the United States. As was to be expected in these times, demonstrations of patriotism were marked. Each person was the recipient of a beautiful flag button and the Stars and Stripes were the chief decorations of the room. The committee of arrangements had prepared an artistic menu and also supplied a pamphlet in which the names of the participants in the banquet were not only arranged alphabetically but also according to their sittings at the respective tables, which numbered 38, in addition to the guest table. A souvenir of the occasion was a burnished envelope opener bearing a reproduction of the association's emblem.

President Louis Birkenstein was toastmaster. He made an eloquent address, in which he set forth the splendid progress made by the association and ended in the hope that this country will not be further involved in the European war, but said, "Should we be so involved as to find it necessary to more actively engage in this in any way, I am sure we will unanimously do everything possible to demonstrate that we are true citizens of the United States, ready and willing to assume our share of responsibility and all that this implies." It had been expected that Mayor James M. Curley, of Boston, would be present, but he was unavoidably prevented from attending. Former Governor E. C. Stokes, of New Jersey, made a witty address, a prominent feature of which was a eulogy of the waste-material industry as a most efficient exemplification of the highest standard of the science of economics.

An interesting episode of the evening was the presentation by F. W. Reidenbach to R. D. Cunningham of a chest of silver in appreciation of the services he had rendered to the association in his able handling of traffic matters before the Interstate Commerce Commission.

At the annual election of officers of the association held in the afternoon of that day the following were unanimously elected: President, Louis Birkenstein; first vice-president, H. H. Cummings; second vice-president, James Rosenberg; third vice-president, E. A. Stone; fourth vice-president, Henry Lissberger; fifth vice-president, Ivan Reitler; sixth vice-president, John J. Ryan; treasurer, Mark Sherwin; secretary, Charles M. Haskins. Directors, James McMeel, Simon Weil, F. W. Reidenbach, Paul Loewenthal, William Lewin, N. J. Lewis, R. D. Cunningham, Daniel M. Hicks, Walter Oppenheimer. Mr. Birkenstein has been president for three terms. His popularity and efficiency are not only shown by his election for a fourth term, but also by the presentation to him of a massive silver loving cup by the members of the Executive Committee. Mr. Haskins, who has ably filled the position of secretary from the beginning, was not only re-elected but his salary was raised.

Blast furnace B at Steelton, Pa., was blown in March 23 by the Bethlehem Steel Company. Furnace A was completed and blown in in August, 1915, and has been giving excellent service. Each is of 500 tons daily capacity. Present plans call for the establishment of an electric light and power plant, adjoining the blast furnaces, the dynamos to be driven by surplus gas from the furnaces. Blast furnaces Nos. 1 and 2, originally built by the Pennsylvania Steel Company, will eventually be dismantled and the sites which they occupy will be used for the enlargement of other departments of the steel plant.

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What Will Congress Do?

The positive statements in regard to the rights of the public or people in general in labor disputes involving companies which are serving the public are a highly important feature of the recent decision of the United States Supreme Court in the case relating to the constitutionality of the so-called eight-hour law. Throughout the very able and vigorous opinion written by Chief Justice White, the rights of the public as paramount to those of the employees and employers are repeatedly affirmed. The paragraph which has probably attracted more attention than any other in the decision is as follows (the italics are ours):

"Whatever would be the right of the employee engaged in a private business to demand such wages as he desires, to leave the employment if he does not get them, and by concert of action to agree with others to leave upon the same conditions, *such rights are necessarily subject to limitation when employment is accepted in a business charged with a public interest*, and as to which the power to regulate commerce possessed by Congress applied and the resulting right to fix in case of disagreement and dispute a standard of wages, as we have seen, necessarily obtained."

The above is not, however, the only important declaration in regard to the public. After reviewing the case at length, the learned justice asserts that it must be granted that a power to regulate to the extent necessary to provide an adequate remedy for the situation must exist unless it be contended that the right to save and protect the public interest did not apply to a case where the destruction of the public right was imminent as the result of a dispute between the parties and their consequent failure to agree. Justice White shows clearly the folly of such a contention, for it attempts to set up the private right above the public right. He maintains that the capacity to exercise private right affords no ground for saying that legislative power does not exist to protect the public interest from the injury resulting from and failure to exercise the private right.

This pronouncement by the highest court in the land makes it imperative for the new Congress to enact the bill introduced in the last Congress providing for the investigation of strikes, or to pass some other measure that will safeguard the interests of

the public even more fully. Recent events have shown very clearly that the labor leaders cannot be depended upon to subordinate the interests of the unions to those of their country. Not long ago, Samuel Gompers, president of the American Federation of Labor, was quoted as saying that no law which would limit or regulate the calling of strikes would be respected. "Law or not law, President or no President," he said, "such a law will not be obeyed." The leaders of the various railroad brotherhoods have also taken a highly arbitrary position in dealing with the railroads, and doubtless would agree with Gompers in opposing legislation intended to prevent widespread suffering on account of strikes. The opinions of such leaders certainly are not entitled to much consideration at the hands of Congress. The Supreme Court having spoken and shown that it is possible by legislation to prevent paralysis of the industry of the country, the duty of the legislators is plain. The question is, Will they have the courage to do it?

Positive Declaration Needed

War, heartless war, which saves not even women, children and relief ships, is being waged on the United States. No one can doubt that fact, although pacifists may quibble about words and contend that while war is being made upon us we are not at war or in a state of war. As war is being made upon us, it becomes a matter of the highest importance to the iron and steel manufacturers of the country to take a position in harmony with most exalted patriotism.

The manufacturers of iron and steel, machinery and munitions have already done much to promote the cause of preparedness in this country. Countless offers to serve the country have been received by the Army and Navy departments. Thousands of men have offered their personal services and many have enlisted to serve their country in numerous ways. Still, absurd as it may seem, there is a widespread feeling in some parts of the country that the agitation for preparedness is due to the greed of manufacturers. To remove all doubt as to the purity of their motives and the genuineness of their patriotism, the manufacturers owe it to themselves and their country to make their position perfectly plain, just as the copper manufacturers have done, that everything, from a tiny nail to a battleship, will

be furnished to the Government at no more than a normal profit and as quickly as possible.

By associated effort, particularly through the American Iron and Steel Institute, the iron and steel manufacturers of the country have accomplished much toward bringing about more cordial relations among themselves and toward putting business on a higher plane. Now is the golden opportunity to take a decided stand, and take it promptly, in showing that they favor war, not for the sake of any financial or personal gain, but because the highest interests of liberty throughout the world, and especially in the American hemisphere, demand that the United States shall take its side and support the forces of the Entente Allies. A declaration should be adopted which would leave not a particle of doubt as to where the iron and steel manufacturers stand in this time of national crisis.

Prospects for the Steel Billet

The time has been seen when the price of steel billets was the controlling factor in the steel market. It was the raw material, and naturally governed largely the prices of the finished product. Steel plants were built for the purpose of supplying billets to the trade. The four-inch billet was described as one of the greatest inventions of the modern steel industry of the time, being so adaptable to various uses. Various improvements in rolling practice changed the situation, while vertical integration, the growth of works which both produced and consumed steel, tended greatly to reduce the vogue of the steel billet in the market. Ultimately the steel billet reached its present position of being merely a product, like coke, pig iron, plates, or railroad spikes, to find its market level according to the law of supply and demand.

Thus it is quite possible for the steel-billet market to have a movement of its own, dissociated from the price movements that occur in pig iron on the one side or in finished steel products on the other. There is such a wide spread between pig iron and billets—several times the cost of conversion—that pig iron can conceivably advance and billets decline at the same time. From the fore part of 1915 to September, 1916, billets advanced more than \$25 per ton, while pig iron did not advance more than one-fourth as much. From that time to the present pig iron has advanced more than one-half as much as billets. The two commodities have not kept step. While there has been a very great advance in billets—there has been a divergence from precedent in the relative amounts by which billets and finished steel products have advanced. In previous movements, billets have advanced approximately as much per gross ton as finished steel products have advanced per net ton. In the movement of 1912, billets advanced materially more than finished steel products. In the present movement billets have advanced materially less than finished steel.

The possibility exists, therefore, that billets may decline before there are declines in either pig iron or finished steel products, and there are suggestions of such a procedure in the fact that billets have not lately maintained their early pace. In some quarters the definite expectation finds lodgment that the billet market really will decline within a period

of months, or before finished steel products decline. In support of such a contention it is pointed out that the termination of shell contracts recently, and in near prospect, operates to release large quantities of billet-making capacity formerly engaged in making forging billets, whereby additional billets for rolling mills become available. It is also urged that such new construction as promises completion in the remainder of this year runs to billet-producing rather than billet-consuming capacity.

If the steel industry had not started at the beginning of this period of new construction with its normal excess of steel-finishing over steel-making capacity, there would now be a surplus of billets, for there have been large additions to productive capacity. In all the past, however, the industry has been so aligned as to be able to finish more steel than could be produced. The exact requirements of the market in the different products could not be foreseen, hence there has been normally an average surplus capacity in each finishing department whereby a relatively heavy demand for rails, for structural shapes, for plates, etc., temporarily developing, could be taken care of. Demand for all finished steel products has been so great that the additional steel has, up to date, found an outlet through rolls of one shape or another. The question is whether this alignment is to continue.

Farmer Ahead of the Game

Since the prices of steel and of agricultural implements have advanced sharply in the past two years, many farmers have been inclined to complain, and the buying of farm implements frequently has been postponed. The farmers thought they were being imposed upon. Dr. W. E. Taylor, in the house organ, *The Furrow*, published by Deere & Co., expresses the opinion that before criticising too harshly it would be well to analyze conditions thoroughly, and he gives some interesting figures as to the advances in prices of materials used by agricultural implement manufacturers, advances in prices of their products and advances in prices paid for farm products. He states that the average price the Kansas farmer received for wheat from 1906 to 1915 was 84 cents per bushel, and it required 178 bushels to pay for a binder; but with wheat at the recent price of \$1.75 per bushel it takes but 97 bushels to pay for the same machine, whose price has been advanced from \$150 to \$170. In the case of a gang plow, he states that it would have taken 74 bushels of wheat to buy it in past years, and now only 48 bushels are required. Evidently the farmer is ahead of the game, and from present indications he will be even more prosperous the present year.

Shop Management in England

It is interesting to note how the germ of scientific management has found a fertile medium in British industrial circles. Hardly a trade or technical publication from England reaches this country that does not disclose discussions of the change for the better in factory operations. The hope appears universal that by no chance will there be a reversion to the labor conditions obtaining prior to the war. Conspicuous in these references are the

admissions that the employer has seen the light as well as the employee.

So far, the British discussions have mainly rotated about the advisability of wage payments on a premium basis as distinguished from wage payments on a piecework basis. Thus it appears that in the main merely the germ of the idea has taken root, but some of the favorable signs are that more generally the British employer is convinced that lower production costs have gone hand in hand with higher wage costs, and that increased investments in securing new machinery and improved equipment have likewise been profitable. Now is the British opportunity for an intensive study of scientific management and for an introduction in connection with all its mechanism of means for emphasizing the personal relation. The last factor is sometimes overlooked or subordinated to a great extent, but if many conspicuous examples may develop before the close of the war there should be less concern than is now evinced everywhere of the attitude of labor when a return to peace conditions ensues and the expected readjustment, however gradual it may be, has to be made.

CORRESPONDENCE

The Safety of Wire Rope

To the Editor: It may be well to publish this letter from R. W. Hicks of the sub-committee on safety of the National Association of Manufacturers in which he criticizes my recent "Block and Pulley Chart":

Having read your article and tested the chart printed in THE IRON AGE, March 1, it occurred to me that you might have overlooked the possibility of inserting size of cable that would safely sustain loads under the various conditions covered.

Believing this would be a valuable addition to the chart and would tend to promote safety in use of cables and cable hoists, I submit the criticism on its own merits, trusting that it will be received in the same spirit in which it is given and hoping that it may be of some value to you.

Immediately after reading this letter I decided that Mr. Hicks was right and that my chart could have been improved as suggested. But after looking through the bulletin of the John A. Roebling's Sons Company, Trenton, N. J., from which I procured the data for the chart, I found that it could not be done very easily, because of the varying strengths of ropes even of the same dimensions.

For example, in the bulletin I find four different tables giving data on as many different constructions of rope. I find that wire rope $\frac{1}{2}$ in. in diameter will safely support a working load of 1.9, 2.2, or 2.4 tons; a rope 1 in. in diameter, 7.2, 7.4, 8.4 or 9 tons; a rope $1\frac{1}{8}$ in. in diameter, 13, 14, 16 or 17 tons, and so on for the many other different sizes.

The user of any given rope should know its safe strength and should never tax it beyond that strength.

The chart shown in THE IRON AGE, March 1, will quickly tell whether or not the rope is being stressed beyond its safe strength.

By procuring a copy of this bulletin and noting its various tables the user will easily learn the safe strength of his particular rope if he does not already know it, or he can write a postal card direct to the manufacturer giving a description of the rope and diameter, and the latter will gladly give its safe strength. It always pays to be on the side of safety.

W. F. SCHAPHORST.

New York City, March 11.

J. F. Duthie & Co., shipbuilders, Seattle, Wash., have received contract for a third Cunard steel vessel. The company signed contracts about two weeks ago for two 8800-ton steel vessels for the Cunard Line.

Important Russian Agency for American Exporting House

Gaston, Williams & Wigmore, Inc., 140 Broadway, New York, has been appointed the commercial representative in America for the Council of the All Metal-Working Industries of Russia. This council is a union of practically all the metal industries in that country, representing an investment of over \$1,000,000,000 in plants and equipment. The purchases to be made in this country will consist of machinery and equipment for the factories of the various members and of other raw materials.

Molders' Strike at Springfield, Mass.

The molders in foundries at Springfield, Chicopee, Chicopee Falls, Holyoke and Indian Orchard, Mass., have planned a series of progressive strikes which it is expected will finally involve all the 26 foundries in the district. Those first affected were the Springfield Foundry Company, Indian Orchard; Lamb Knitting Machine Company, Chicopee Falls, and J. & W. Jolly Machine Company, Holyoke.

The present schedule is \$3.60 for a 9-hr. working day. The original demands were for \$4.50 a day, but these have now been modified to \$4.25 a day. The foundry owners state that a compromise of \$4 a day, to continue until fall, had been accepted by a committee of the Molders' Union, but that the unions repudiated the agreement.

The strike at the H. B. Smith Company, Westfield, Mass., which is in its fourth week, is under consideration by the State Board of Conciliation and Arbitration, which has been holding lengthy hearings on the dispute. The case centers about a single employee who had been changed from day work to piece-work, without good reason according to the union officials. The company is running with a greatly diminished force.

Smith Steel Casting Company Expanding

The Geo. H. Smith Steel Casting Company, Milwaukee, Wis., which has operated three two-ton converters for years, is installing a three-ton acid open-hearth furnace of the McLain-Carter type, which will considerably increase the melting equipment. It is expected to have the new furnace in operation about April 20. The capacity of the plant will then be about 1000 tons per month, principally of small castings averaging about 18 to 20 lb., and ranging from 1 oz. to 12,000 lb. in weight.

The company has found it difficult to take care of its largely increased business, and this addition will enable it to serve its customers more satisfactorily. While its specialty is Dynamo, or low-carbon steel for electrical purposes, still it furnishes machinery and alloy steel castings of almost any description. A large portion of its business consists of small machine-molded castings which are ordered in large quantities, and the company is doing a large business of this character with manufacturers of tractor and auto trucks.

Smiley Steel Company Established

J. B. Smiley, for 10 years with the Pennsylvania Steel Company in the operating and sales departments and for the last four or five years conducting his own business in Western Canada in engineering and contracting and as representative of some American manufacturers, is head of the Smiley Steel Company, Inc., organized under New York State laws with a paid-up capital of \$100,000. The company has established headquarters in the Equitable Building, 120 Broadway, New York City, and has available for sale for relatively prompt shipment various forms of semi-finished and finished steel. Included among the products which it handles are billets, slabs and wire rods, rails, bars and sheets and tank plates. The company has a number of mill connections and plans to do a domestic as well as an export business. It is understood that a number of well-known personages in the steel trade are associated with Mr. Smiley, who is president and manager. Herbert M. Williams is vice-president and George W. Porter is secretary and treasurer.

BOARD OF EXPERTS

Is Appointed by Secretary Baker to Standardize American Munitions

WASHINGTON, March 27, 1917.—The standardizing of American munitions has been placed in the hands of a Board of Experts by the Council of National Defense. The six men suggested by the council and appointed by Secretary of War Baker are as follows:

Frank A. Scott, Warner & Swazey Company, Cleveland, manufacturer of turret lathes and other machinery.

W. H. Vandervoort, Root & Vandervoort, builders of special machine tools, and president Moline Automobile Company, Moline, Ill.

E. A. Deeds, formerly general manager National Cash Register Company, and president Dayton Engineering Laboratories Company, Dayton, Ohio.

Frank Pratt, General Electric Company, Schenectady.

Samuel Vaucrain, Philadelphia, Baldwin Locomotive Works, Remington and Westinghouse companies.

has the department been in such excellent position to secure the delivery of small arms on short notice and no difficulty is anticipated in turning out rifles, automatic pistols, etc., as fast as recruits can be obtained to use them.

The War and Navy departments have obtained the co-operation of the Civil Service Commission and its 3000 local boards of examiners to secure as many skilled workmen as possible for employment in navy yards, arsenals and other Government plants. The Commission has also opened a waiting list of eligibles who may be called in an emergency. The Commission has prepared posters to be displayed in Post Offices and other public buildings throughout the country calling attention to the fact that the Government needs shipwrights, boiler-makers, machinists, blacksmiths and workmen of many other classes. The wages offered correspond to those paid by private employers in the vicinity. The examinations required are based largely on physical ability and experience. Persons who cannot immediately enter the public service are urged to write to Commission headquarters in Washington, giving their names, addresses and the class of work they could do for the country, if called upon. In



E. A. DEEDS



SAMUEL VAUCLAIN



W. H. VANDERVOORT



FRANK A. SCOTT

Four Members of Board of Experts Appointed to Standardize Munitions

John E. Otterson, vice-president Winchester Repeating Arms Company, New Haven, Conn.

The newly appointed board held its first formal meeting at the War Department March 22 to plan a system of co-operation with the Ordnance Bureau. Several members have been doing similar work in connection with the contracts for munitions for the Entente Allies and have also rendered valuable service to the Government of the United States in preparing to mobilize the industries of the country.

It is understood that the board will be consulted in the distribution of the jigs, dies, gages, etc., authorized by Congress to be placed in the plants of private manufacturers for the production of small arms made to United States army standards. The appropriation act for the current fiscal year carried a small fund for this purpose, which was substantially augmented in the army appropriation bill for 1918, which failed of passage. Congress at the coming session will probably make a very liberal allotment for the distribution of this special equipment unless it is decided to utilize an emergency fund for the purpose. The War Department finds itself embarrassed by the exceedingly narrow limits placed by the present law upon the educational orders which might be placed with concerns in whose plants this special equipment was installed, but it is believed that all technicalities will be swept away in the legislation soon to be enacted by Congress and in any event that the actual requirements of the army on its new basis will compel the manufacture in the specially equipped private plants of quantities of small arms far in excess of the educational orders heretofore authorized. Ordnance experts express the opinion that never before in the history of the Government

this way the Commission hopes to perfect a national labor mobilization scheme similar to that already worked out in England and France.

W. L. C.

New England Workmen in Greater Demand

The speeding up of work in the Government armories and arsenals and in Government and private shipyards is beginning to have an effect on the labor situation in New England. Orders have been issued to run the Springfield Armory and the Watertown Arsenal on two 10-hr. shifts instead of two 8-hr. and to increase the night force to the same size as that of the day. At the Springfield Armory the plan is to increase the working force from about 1300 men to 2500 men, which will enable the plant to turn out 1000 rifles a day. At the Portsmouth Navy Yard about 2000 civilians are now employed and it is expected that 1000 will be added to the force. This yard is now engaged in building 10 submarines of the large type, of which one is partially completed and two more are laid down. Practically \$500,000 will be needed to fully equip the yard to push this new work.

One interesting result of the need for experienced armorers is the amendment to the rule prohibiting the ordnance department of the army from employing mechanics over 55 years old, so that all physically qualified old armorers can be reinstated in the service.

The Railway Tie Corporation, Railway Exchange Building, St. Louis, is preparing plans for the early construction of its rolling mill. The equipment will provide for the production of steel ties, bars, angles, tees, etc.

HEAVIER LOADING OF CARS

Shippers Should Do Their Part in Fully Utilizing Equipment

BY J. F. TOWNSEND*

The tremendous increase in business throughout this country has created a large number of embargoes in all of the territory east of the Mississippi River, resulting in the greatest car shortage that the shipping public has ever been afflicted with.

This has been especially the case at all of the steel producing points located in the Pittsburgh, Cleveland, Youngstown, Buffalo and Chicago districts.

These conditions which have interfered very seriously with the operation of the steel works, resulting in almost regular banking of blast furnaces and the shutting down of steel mills intermittently, have now become the rule instead of the exception. There does not seem to be any chance for improvement, excepting the hope of more favorable weather conditions, but the spring weather will bring the opening of navigation on the Lakes, when the demand for equipment to supply coal mines with cars for Lake coal will be increased, and the demand for a greater number of cars required to move the largest shipments of iron ore that the country has ever had makes it very plain to those in touch with the situation that there will be very little improvement in the car supply, unless the shipping public can be aroused to a full appreciation of this very serious problem and give their co-operation toward the utilization to the fullest capacity of all cars.

While there have been some great strides made in the adoption of modern equipment of large capacity and improved methods for heavier loading of cars, the increased volume of traffic that the railroads are confronted with to-day has far exceeded the most advanced plans of the railroads to provide adequate facilities for the natural increase in the general business, to say nothing of the abnormal volume of business that we have at present.

The railroads have grappled with the situation in a heroic manner, attempting to handle traffic that would be sufficient to support nearly double the number of railroads that we have to-day, or, at all events, double the facilities and rolling stock in the section of the country east of the Mississippi River, and if the shippers will do their part toward utilizing equipment to the fullest extent and consignees unload all cars promptly at destination, they will do more toward clearing up a very bad situation than by criticising the overtaxed railroad men.

The 12 shipping companies of the United States Steel Corporation have conducted a vigorous campaign for the heavier loading of cars, and during the year 1916 the average carload of these companies was 80,400 lb. per car. This is a remarkable showing, when it is taken into consideration that the average capacity per freight car in this country is only 80,000 lb., according to the statistics compiled by the Bureau of Railway Economics, and it is hard to realize this record of heavy loading when the average carload of all railroads throughout the country on all traffic, including the steel traffic referred to, was only 42,200 lb. per loaded car, or an average of 38,200 lb. per car less than the record made by the 12 shipping companies of the United States Steel Corporation.

While the 12 shipping companies referred to increased the average carload on outbound shipments during the year 1916 only 1800 lb. per car, there was effected an actual saving of 37,202 cars, as compared with the loading for the year 1915, when the average was 78,600 lb. per loaded car. This does not include the cars used by the Oliver Iron Mining Company in shipping the millions of tons of ore that were forwarded during the year, all of which cars were loaded to the average of 50 tons per car, that would only have tended to increase the average load and might be considered misleading.

*Traffic manager, National Tube Company.

The saving, according to the basis used by the American Railway Association in its compilation of Feb. 6, 1917 (which places the average earnings of a freight car at least at \$2.50 a day), and using that method of calculation, i.e., multiplying 13,578,730, the number of idle car days, by these average earnings per day, it shows that during the year 1916 the railroads have enjoyed a gain in gross earnings of \$33,946,825.00, on account of the heavier loading of cars, that effected a saving of 37,202 cars, for it means that these cars were in other service.

To put this the other way round, it means that the 12 shipping companies actually forwarded 1,495,520 more tons of traffic than if the practice of loading one year ago had been followed, and this increased traffic was enjoyed by the railroads without any additional operating expenses.

According to the Interstate Commerce reports compiled for the fiscal year 1916, the average haul per ton of revenue freight throughout the country of the individual railway was 162 miles, and the loaded freight cars per train was 25 cars. On this basis, the railroads throughout the United States were saved 6,026,724 car miles, or a saving of 241,069 train miles; the 37,202 cars saved means that these cars were in other service and at the average freight revenue of 15.84c. the actual saving of the 37,202 less cars used resulted in increased earnings to the railroads of \$954,633.38 without any increased operating expenses.

It is gratifying to notice in a recent issue of the *Railway Age Gazette* a very full description of the new 85-ton hopper car recently constructed by the Pennsylvania Railroad at its Altoona shops; with the 10 per cent allowed above capacity, this car will carry 187,000 lb. or 93.5 tons, and this really means that the 100-ton car will soon appear. It seems appalling to look at this huge car that will practically hold 100 tons of freight, when the records compiled show that the average carload throughout the United States is but 21.2 tons, or substantially one-fifth the capacity of this monster freight car. This is a hopper car constructed with five drop doors, suitable for handling coarse freight, such as iron ore, coal, coke and limestone, all of which should be loaded to the full carrying capacity.

During the last five years the 12 shipping companies of the United States Steel Corporation have effected a saving of 202,898 cars through the heavier loading of equipment, a record probably unmatched in this country for the period referred to.

The shippers, consignees and the railroads themselves have been greatly benefited in the fewer number of cars switched and weighed, to say nothing of the relief of terminals and great saving in operating expenses that would have been created had it been necessary to handle this additional number of both empties and loads through the various classification and interchange yards of the railroads from point of shipment to destination.

This record proves conclusively the real value of conserving the freight car equipment at all times.

The Austin Company, Cleveland, industrial builder, has recently taken the following contracts, through its Philadelphia office: Boiler shop, 100 x 220 ft., of steel-frame construction, for the Tidewater Oil Company, Bayonne, N. J.; factory building, 100 x 200 ft., steel frame, one story, for the Singer Mfg. Company, Elizabethport, N. J.; three buildings, one 50 x 200 ft., one 50 x 300 ft., and a saw-tooth machine shop, 100 x 200 ft., for the American Engineering Company, Philadelphia; and four buildings for the American Refractories Company, Baltimore. The Cleveland office of the Austin Company has taken a factory building, 98 x 220 ft., for the Torbensen Gear & Axle Company, Cleveland, and a factory building, 100 x 160 ft., for the Standard Equipment Company, Cleveland.

The Blandon Rolling Mill, Blandon, Pa., has been incorporated with capital stock of \$150,000, by F. C. Smink, Samuel R. Seyfert and William Seyfert, all of Reading. The purpose is evidently to start up the long idle Blandon mill.

SPECIAL SESSION CONGRESS

Character of Probable Legislation at the Coming Session

WASHINGTON, March 27, 1917.—The special session of Congress that will convene next Monday, pursuant to the President's recent call, will meet under conditions wholly unprecedented in the history of the country. Summoned to deal with the situation that has developed as the result of the sinking of American merchant ships and the loss of American lives, its first duty will be either to declare war on Germany or to give official recognition of an existing state of war. It will then take up for consideration a measure of broad scope granting to the Chief Executive authority to take any steps that may be necessary for the protection of American lives and property. This measure will carry a large appropriation, estimated at \$500,000,000, to be expended in the purchase of war material and in the recruiting of the army and navy.

Never before in our national history has Congress convened under conditions which made it absolutely impossible to foreshadow the political control of the House of Representatives. This uncertainty, considered in the light of the nearest approach to a precedent, may defer for some time the delivery of the address President Wilson is preparing as a basis for Congressional action. Until the House is organized it will not be practicable, according to the most experienced parliamentarians here, either for the President to address a joint session or for the passage of so simple a legislative measure as a joint resolution. In the meantime Administration officials are urging that some parliamentary device be adopted by which the legislation desired by the President can be put through the House by unanimous consent before the opening of the fight for organization. There is little hope that this can be done.

As soon as the measures dealing immediately with the war have been disposed of, Congress will take up the five budget bills which failed of passage at the recent session—the army, sundry civil, military academy, general deficiency and urgent deficiency bills. Notwithstanding the desire of the President to limit the general legislative work of the session, there are at least two important subjects that will demand attention, namely, the Webb bill legalizing combinations of exporters and a series of measures dealing with the railroads. The President regards the Webb bill in the light of a war measure in that it should be placed on the statute books before peace is declared, so that American business men may take advantage of its provisions in their efforts to hold and to extend the trade gained during the great European conflict. He is also squarely on record in favor of a law not prohibiting an individual railroad employee from quitting his job, but making it an offense to organize a strike of railroad employees until the dispute on which it is predicated has been made the subject of a thorough investigation with full publicity by a Federal commission. Mr. Gompers has declared that if such a law were passed he would disobey it. It is now for Congress to determine, in the light of the decision of the Supreme Court, whether the public or the labor leaders are to be given first consideration in meeting one of the most important issues now before the country.

An effort will be made to pass the bill enlarging the Interstate Commerce Commission and authorizing its division into sub-commissions with a view to expediting the public business. This bill should require very little consideration, and so far as is known there is no opposition to its prompt enactment.

While the enormous appropriations made by the last Congress and in prospect at the special session far outrun the revenue projects now on the statute books, there will be much opposition to any plan contemplating the recasting of the revenue laws before next winter. It is urged that Congress can safely rely on short-time Treasury certificates or further bond issues to supply the funds necessary for the support of the Government until the productivity of the two revenue measures passed by the last Congress has been demonstrated.

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On the other hand, many influential members of both houses will insist on revenue legislation and schedules are already being prepared of new taxes designed to meet the extraordinary war disbursements.

It is improbable that the tariff will be amended at this session, although the sugar duty may be increased. President Wilson has given recess appointments to the six members of the new Tariff Commission whose nominations the Senate, at its recent special session, failed to confirm, and the commission will be speedily organized with a view to gathering the data necessary to the comprehensive revision of the Underwood-Simmons tariff act soon after peace is declared.

W. L. C.

The International Commercial Outlook*

Trade Currents Not Permanently Changed by War—Need to Focus on Business with Neutral Nations—Promise of the Tropics

BY O. P. AUSTIN

INTERNATIONAL trade after the war will be quite similar to the international trade before the war. The great trade currents which have been developed in the century since the steam vessel and railway reconstructed the commerce of the world and multiplied its activities are the result of natural conditions which cannot be permanently interrupted by even such a titanic struggle as that which we are now witnessing. Certain great sections of the world have become its chief producers and distributors of manufactures and must so continue for many generations, while certain other sections have become and must continue to be the chief producers of foodstuffs and manufacturing materials. Exchanges between countries only separated by imaginary lines and thus made at less cost than those with more distant countries will speedily resume, both as a matter of convenience and as business economy. Business is little influenced by sentiments.

The war between the two sections of our own country in which the bitterness was great, was followed by a rapid resumption of trade between the sections. The internal commerce of the United States amounted at the beginning of that war to approximately \$3,000,000,000, and was by 1870, five years after its close, more than double that of 1860; the products of the two sections were freely interchanged, and business relations promptly re-established.

Trade relations were quickly resumed between France and Germany following the war of 1870-71, in which the bitterness was quite as great as that which now exists. Imports of France from German territory in 1869, the year prior to that war, were \$50,000,000 in value; in 1872, the year following the war, practically \$70,000,000, and averaged \$66,000,000 per annum in the five years after the war. German imports from France in the same period showed an even larger gain, having been in the year before the war, \$60,000,000, while the annual average in the five years following the war was \$83,000,000. Thus trade between France and Germany showed an increase of 40 per cent in the years immediately following the war.

The trade relations between the United States and Spain following our own war with that country were promptly resumed and quickly increased. Our imports from Spain in the five years following that war averaged \$6,000,000 per annum, an increase of 50 per cent, while our exports to that country averaged \$14,000,000 per annum in the five years following the war, representing an increase of 25 per cent.

Japan's exports to Russia, which were about \$1,500,000 in the year prior to that war, averaged more than \$3,000,000 per annum in the five years after her war with that country, an increase of over 100 per cent in a five-year period.

Trade Relations of the Countries Now at War

Great Britain alone sells in times of peace to the Central Powers about \$400,000,000 worth a year of her products, and buys from them another \$400,000,000 of merchandise which she must have, and which it is more convenient for her to purchase from that nearby territory than to bring at greater expense of transportation from other parts of the world. France sold to the Central Powers in the year preceding the war about \$200,000,000 worth of merchandise, and bought from them \$250,000,000 worth. Russia's exports to the Central Powers averaged \$250,000,000 a year, and her purchases from them \$325,000,000 a year.

The recorded trade of the Central Powers with the

Allies was about \$3,000,000,000 a year; while the records of the Allies also show their trade with the Central Powers about \$3,000,000,000. Of course, this counts the merchandise twice, once when it is exported and again when imported; but this is true of all aggregations of world commerce, that the value of the merchandise is stated when exported and again when imported. Can we believe that 10 of the most alert commercial countries of the world are going to throw away opportunities to sell three billion dollars worth of merchandise a year, or to buy that three billion dollars worth of their requirements at less cost than they can bring them from more distant countries, merely as a result of conditions which have never before, in any part of the world, resulted in permanent interruption of trade relations?

Industrial Power of Belligerents After the War

The annual average of net gain in population of the European countries now at war is a little over 5,000,000 per annum. Of this number approximately one-half are males, and we may thus assume that the net increase in the number of male persons entering the industrial age, and thus available for industrial pursuits in the countries in question, is in the two and one-half years since the beginning of the war about 6,000,000, while the war losses by death and permanent disability, according to the latest computations, are but about 4,500,000. In addition to this it is a well-known fact that in all these countries the loss by emigration has been suspended, and that many of their former emigrants have been called home. Then, too, there have been in those countries large additions to the number of women employed in industrial and business pursuits. We may, therefore, safely assume that the countries in question, when they emerge from the war and return to the pursuits of peace, will find themselves with a materially larger industrial, and therefore commercial, element than they had at the beginning of the war. More than this, the industrial machinery has been speeded up to a much greater producing power than ever before. Of course, a brief period will be required to transform their factories from those producing war materials to those required for peace. But the very facility with which factories were transformed from a peace status for manufactures to be utilized for war illustrates the promptness with which the change can, and doubtless will, be made in the European countries upon their return to peace.

Destruction of Shipping and Effect on World Trade

The latest estimate of vessels destroyed is about 5,000,000 tons, or about 10 per cent of the world's total tonnage at the beginning of the war, but as it is asserted that the production of new ships meantime has been one-half as much as the tonnage destroyed, we may assume that the net loss thus far is not over 5 per cent, and that this loss unless greatly increased will be so evenly distributed in world trade as to be comparatively unimportant in the relative commercial power of the great trading nations.

In attempting to determine our own power to compete in manufactures sent to foreign fields we must take into consideration the fact that prices of raw materials and of labor have been with us enormously increased, and as a consequence there has come a corresponding advance in our own cost of production. To what extent we shall be able to return to normal conditions in cost of production of manufactures, either in prices of raw materials or wages paid, is a subject for the future, and one which will be extremely difficult to meet, since a reduction of wages will doubtless be

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more difficult than that by which the recent and very large advances have been made.

Manufactures the Chief Hope of Our Export Trade

The gain which we have made in our exports to the neutral world, \$685,000,000, occurs in a class of merchandise which must be our chief hope in the future growth of our export trade. We must expect that the chief gains in our exports in the future will occur in manufactures, and while we shall have a harder fight to develop an increased trade in manufactures than we ever had in selling the natural products, because of the sharp European competition which we shall encounter in manufactures, we must make that fight if we are to maintain our rank and prosperity as an exporting nation.

To belligerent Europe there will also be opportunities in the first year or two after the war for sales of our manufactures, especially material for construction of new buildings and railways to take the place of those destroyed and the establishment of new factories, but this will be temporary, for manufacturing Europe will soon be able to supply its own requirements in this line. But in all the neutral world, North and South America, Asia, Africa and Oceania, the demand for manufactures will continue and increase with the general revival of business and industrial development which will come with a return to world peace. And it is to that field that our manufacturers should give their special and earnest attention, to retain the gains which we have already made and increase them in the face of the vigorous competition which they must expect from those who have occupied that field in the past.

New Opportunities in the Tropics

There is a great section of the world yet undeveloped in its producing power and therefore its purchasing power. Between the 30th parallel of north latitude, which runs through New Orleans, North Africa, Northern India and Southern China, and the 30th parallel of south latitude, which cuts through southern Brazil, the southern tip of Africa, and the southern part of Australia, is half the land area of the world outside the polar regions, and one-half the world's population. Yet the commerce of this great tropical belt is but one-sixth that of the international commerce of the world, and it has but one-seventh of the world's railways, despite the fact that the temperate zones are calling for its products of food and manufacturing material. We ourselves brought into continental United States last year a billion dollars worth of the products of the tropics, and other parts of the temperate zone are making similar demands upon that area, which fails to respond to these demands because of the lack of transportation facilities.

The chief cause of its slow development in the past has been the absence of any method by which the natural products could be transported from the place of the production to the common carrier. The lessons of the war have proved that the horseless vehicle is capable of transporting men and merchandise over comparatively roadless areas, and the flying machine capable of facilitating a close study of topographic conditions in any climate and under any circumstances. By conquering the tropical half of the world and compelling it with the co-operation of the temperate zones to supply its proper share of the requirements of man, new markets will be opened for the products of the temperate zone, and a new era of world development marked in production, consumption, industry, commerce and finance.

Plans for the reorganization of the Champion Iron Company, Kenton, Ohio, are under way, with a view of bringing in additional capital and increasing the volume of business. A step in the reorganization plans has been made in the appointment of W. W. Durbin as receiver of the company. R. W. Valls continues as manager of the plant and engineer. The company recently began the manufacture of electric traveling cranes, and has a large amount of business on its books.

Pittsburgh and Nearby Districts

At the annual meeting of the directors of the National Roll & Foundry Company, held at Avonmore, Pa., last week, William Goudy was elected president, treasurer and general manager; D. H. Slonaker, first vice-president and secretary; M. E. Baird, second vice-president; Francis Kaib, assistant treasurer, and W. H. Melaney, general sales manager. The directors include the above and William Banfield, Joseph Imler, A. J. Baird and F. H. Simpson.

The Brier Hill Steel Company, Youngstown, Ohio, expects to put in operation about April 15 its new plant of 84 Koppers by-product coke ovens. The plant will make coke for the company's Grace and Tod blast furnaces.

Work is progressing rapidly on the new steel bridge being erected by the LaBelle Iron Works across the Ohio River at Steubenville. It will be completed about May 15 and will be used in bringing coke from the company's new Koppers by-product coke plant on the West Virginia side, to its two blast furnaces at Steubenville. The output of tar has already been sold to the American Tar Products Company, which has built a plant near the coke ovens. The output of sulphate of ammonia is sold by the company itself, and it will soon be a producer also of toluol and benzol. It has placed a contract with Heyl & Patterson, Inc., for a new ore bridge of 5-ton bucket capacity.

W. E. Carrell has retired from the firm of Edgar M. Moore & Co., Farmers Bank Building, Pittsburgh, dealers in second-hand machinery. The business will be continued as before, under the same name. A warehouse and yard are maintained at 916-922 Beham Street, North Side, Pittsburgh.

The Youngstown Sheet & Tube Company is stated to have done a total business in 1916 of \$56,000,000, with loss through bad accounts of only \$14,000, which is considered a remarkable record. Walter Kauffmann is in charge of the credit department.

The 72-in. 3-high plate mill in the plant of the Youngstown Iron & Steel Company, at Youngstown, Ohio, now owned by the Sharon Steel Hoop Company, which has not been operated for several years, is being put into shape, and is expected to start up shortly after April 1. Owing to the taking over of the Youngstown Company by the Sharon Company, more steel is available, and for this reason it was decided to again operate the plate mill, and take advantage of the high prices ruling on plates. The mill has a capacity of about 5500 tons of plates per month.

The plant of the Sligo Iron & Steel Company at South Connellsville, Pa., recently leased by Richard Irvin and associates of Pittsburgh, will be put in operation at an early date in the manufacture of refined iron bars and other specialties. It is probable that the new owners will later install several open-hearth furnaces.

The Erie Lighting Company, Erie Pa., will take bids April 1 for a power plant, 230 x 200 ft., to cost, with equipment, \$1,000,000. Frederick B. Hoff is vice-president and general manager.

Locomotive Orders

Orders for locomotives in the last two weeks amount to 30, made up mostly of small orders of one or two engines. The two largest orders are 10 locomotives for the Grand Trunk, which the Canadian Locomotive Company will furnish, and 8 locomotives for the Richmond, Fredericksburg & Potomac, which the American Locomotive Company will build. The Chicago & Northwestern is inquiring for 50 locomotives and the Pere Marquette for 6. Total orders for locomotives up to and including March 24 are estimated at 222. These, with the 1106 locomotives ordered in January and February, make the total up to the first of this week 1328 locomotives, of which 271 are for export.

The new furnace of the Inland Steel Company, Chicago, which has been awaiting a supply of coke, will probably go into blast about the second week in April.

Iron and Steel Markets

NEW HIGH PRICE RECORDS

Concessions to the United States

Billets, Plates and Iron in Price Procession— 200,000 Tons Rails for Mesopotamia

As this issue goes to press, steel makers are in conference and the price at which steel mill products will be supplied to the Government is under discussion. Without regard to the concession which will be made, it is to be remembered that the total consumption for Government purposes does not bid fair to exceed 2 per cent of the country's productive capacity. Much of it, of course, will get first attention and by that fact penalize domestic consumers in respect to delivery.

Representing an effort to serve the Government without regard to other obligations of the mills, it is not yet believed that any price reductions are likely in future purchasing for the governments of the Allies. Signs are that general exporting will carry stiffer prices rather than otherwise.

Domestic buying has been of no inconsiderable magnitude in the last few weeks, in anticipation of the readiness with which a high market augments with a demand. And here there has been the spectre of the Government with its great resources and the ultimate possibility of its needing material on a gigantic scale. One sign of the present distortion is a further delay in shipments of boiler tubes because of the Government program with its fleets of little as well as big ships.

The week has been like those of the last two months; higher prices have been established for certain products. Important this week is an advance of \$5 in billets and sheet bars. In fact, a sale of 1500 tons of sheet bars is noted at \$2.50 above the \$70 of the recent market and for delivery at mill convenience. One of the striking advances in a division which has long been spectacular was in plates; a price of 8c. has been accepted on 3000 tons of hull plates for the first quarter of next year, and it represents only half of the amount the Atlantic coast buyer was desirous that the mill should take.

Advances in pig iron must still be written. In basic the advance has been no less than \$3, with round sales made at the top price, \$35. In the last ten days it is estimated that business in basic in the Central West has exceeded 100,000 tons. The further advances in foundry and Bessemer iron are for \$1 at Valley furnaces, as established by round lot sales. A Cleveland interest sold 90,000 tons of iron last week and has booked about 2½ months of its output in 1918. Charcoal iron has sold at \$2 above last week's quotations, and a scarcity appears to be developing. Consumers are more generally concerned over covering for 1918 shipments, while producers are standing off such offers in the face of the strong upward tendency.

Cast iron pipe is again higher, two lifts in one week, amounting to \$5 per ton, occurring in the East and thus more than meeting last week's rise in the West. Higher figures have been named for Bessemer ferrosilicons.

A side light on the progress of the war is thrown by the receipt in this country of an inquiry for 200,000 tons of rails for Mesopotamia. Fresh lots of 40,000 tons are wanted by France and Belgium, and Java would buy 18,000 tons.

If recent history repeats itself, higher prices will soon be named on wrought pipe and wire. The same pipe mill which took the step a few weeks ago in demanding \$4 more per ton, has now changed its discounts so that on all sizes and kinds of its product, black as well as galvanized, the selling price will be about \$10 further up on the scale. The same company which several weeks ago was selling wire \$3 per ton above the ruling market is doing so again.

New developments are expected next week on sheets and tin plate. Though the country's capacity is put at 5,000,000 boxes more than in 1916, a shortage is feared. The leading interest will fix prices for the third quarter on sheets and the last half on tin plate, chiefly, it is presumed, to meet the wishes of consumers who desire to establish thus early their manufacturing basis.

The railroad situation has so far improved that prompt coke for furnace use is now obtainable at \$8 against \$12 four weeks ago and for foundry use at \$10 against \$13 a month ago. None of the stacks of the Carnegie Steel Company is idle for lack of coke but there are 12 undergoing repairs.

Besides the 8c. ship steel noted above, tank plates have sold at 6.50c., Pittsburgh basis, for the first quarter of next year. Interest no longer lies in the inquiries but in the business which succeeds in getting mill acceptance.

In general structural steel letting, manufacturing plant extensions have again been somewhat conspicuous. In all 30,000 tons in relatively large work was put under contract in the week.

Pittsburgh

PITTSBURGH, PA., March 27, 1917.

Sensational advances in prices have again taken place on pig iron, semi-finished steel and some lines of finished products. Basic pig iron is up \$3 per ton, and Bessemer and foundry iron \$1 to \$2, while soft billets and sheet bars are up fully \$5 from the minimum prices that have heretofore ruled. There has been a sharp upward turn in prices of steel scrap, some grades having advanced as much as \$5 per ton. It is likely that in the week starting April 2 the American Sheet & Tinplate Company will fix prices on all grades of sheets for third quarter delivery and also on tin plate for shipment over the last half of the year. It is predicted that Bessemer iron will go to \$50 and basic to \$40 within the next 30 days. In fact some sellers are already quoting \$40 on Bessemer iron, but so far no sales have been made at this price with the possible exception of a few small lots for late delivery. The fact that the Government is expected to be a heavy buyer in steel in various forms within a short time is no doubt having its influence in setting up prices. In addition there is a scarcity in the supply of Bessemer and basic iron, and consumers seem keen to cover ahead. The car situation is slow-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Mar. 28, 1917.	Mar. 21, 1917.	Feb. 28, 1917.	Mar. 29, 1916.
No. 2 X, Philadelphia...	\$39.00	\$39.00	\$33.00	\$20.25
No. 2, Valley furnace...	38.00	37.00	34.00	18.50
No. 2 Southern, Cin'tl...	32.90	32.90	28.90	17.90
No. 2, Birmingham, Ala...	30.00	30.00	26.00	15.00
No. 2, furnace, Chicago*	38.00	37.00	33.00	19.00
Basic, del'd, eastern Pa...	35.00	35.00	30.50	20.00
Basic, Valley furnace...	35.00	32.00	30.00	18.25
Bessemer, Pittsburgh...	38.95	37.95	35.95	21.95
Malleable Bess, Ch'go*	38.00	37.00	33.00	19.50
Gray forge, Pittsburgh...	34.95	32.95	31.95	18.45
L. S. charcoal, Chicago...	38.75	36.75	35.75	19.75

Rails, Billets, etc., Per Gross Ton:	Mar. 28, 1917.	Mar. 21, 1917.	Feb. 28, 1917.	Mar. 29, 1916.
Bess. rails, heavy, at mill	38.00	38.00	38.00	28.00
O.-h. rails, heavy, at mill	40.00	40.00	40.00	30.00
Bess. billets, Pittsburgh...	70.00	65.00	65.00	45.00
O.-h. billets, Pittsburgh...	70.00	65.00	65.00	45.00
O.-h. sheet bars, P'gh...	72.50	65.00	65.00	45.00
Forging billets, base, P'gh	90.00	90.00	90.00	65.00
O.-h. billets, Phila...	65.00	65.00	65.00	50.00
Wire rods, Pittsburgh...	85.00	85.00	80.00	57.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia...	3.659	3.659	3.409	2.559
Iron bars, Pittsburgh...	3.50	3.50	3.25	2.40
Iron bars, Chicago...	3.10	3.00	3.00	2.35
Steel bars, Pittsburgh...	3.75	3.75	3.25	2.75
Steel bars, New York...	3.919	3.919	3.419	2.919
Tank plates, Pittsburgh...	5.50	5.25	5.00	3.50
Tank plates, New York...	5.669	5.419	5.169	3.869
Beams, etc., Pittsburgh...	3.75	3.75	3.25	2.50
Beams, etc., New York...	3.919	3.919	3.419	2.669
Skelp, grooved steel, P'gh	3.75	3.50	3.50	2.30
Skelp, sheared steel, P'gh	4.00	3.75	3.75	2.40
Steel hoops, Pittsburgh...	4.25	4.00	3.75	3.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Mar. 28, 1917.	Mar. 21, 1917.	Feb. 28, 1917.	Mar. 29, 1916.
Sheets, black, No. 28, P'gh	5.00	5.00	4.75	2.75
Sheets, galv., No. 28, P'gh	7.00	7.00	6.75	4.75
Wire nails, Pittsburgh...	3.20	3.20	3.00	2.40
Cut nails, Pittsburgh...	3.75	3.70	3.70	2.30
Fence wire, base, P'gh...	3.15	3.15	2.95	2.25
Barb wire, galv., P'gh...	4.05	4.05	3.85	3.25

Old Material, Per Gross Ton:	Mar. 28, 1917.	Mar. 21, 1917.	Feb. 28, 1917.	Mar. 29, 1916.
Iron rails, Chicago...	\$28.00	\$28.00	\$27.00	\$18.00
Iron rails, Philadelphia...	29.00	28.00	28.00	20.00
Carwheels, Chicago...	22.00	21.00	18.00	14.50
Carwheels Philadelphia...	23.00	22.50	20.50	17.50
Heavy steel scrap, P'gh...	27.00	22.00	22.00	18.50
Heavy steel scrap, Phila...	24.50	24.00	22.00	17.50
Heavy steel scrap, Ch'go...	25.00	24.50	22.25	16.75
No. 1 cast, Pittsburgh...	23.00	21.00	20.00	16.25
No. 1 cast, Philadelphia...	23.00	23.00	20.00	17.00
No. 1 cast, Ch'go (net ton)	18.25	17.25	15.00	13.50
No. 1 RR. wrot, Phila...	31.00	32.00	27.00	23.00
No. 1 RR. wrot, Ch'go (net)	27.50	27.00	24.00	17.25

Coke, Connellsville, Per Net Ton at Oven:	Mar. 28, 1917.	Mar. 21, 1917.	Feb. 28, 1917.	Mar. 29, 1916.
Furnace coke, prompt...	\$8.00	\$8.50	\$12.00	\$3.25
Furnace coke, future...	7.00	7.00	7.00	3.00
Foundry coke, prompt...	10.00	10.50	13.00	3.75
Foundry coke, future...	7.50	7.50	7.00	3.50

Metals, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	35.50	36.00	36.50	27.12½
Electrolytic copper, N. Y.	35.50	36.00	36.50	26.87½
Spelter, St. Louis...	10.50	10.37½	10.50	17.50
Spelter, New York...	10.75	10.62½	10.75	17.75
Lead, St. Louis...	9.25	9.37½	9.62½	8.00
Lead, New York...	9.40	9.50	9.75	8.00
Tin, New York...	55.87½	56.00	50.50	50.00
Antimony (Asiatic), N. Y.	35.00	32.00	31.00	45.00
Tin plate, 100-lb. box, P'gh	\$8.00	\$8.00	\$7.50	\$4.25

ly improving but is still far from being satisfactory either to the railroads or to shippers. The larger supply of cars has resulted in a further decline in prices of prompt furnace and foundry coke, furnace coke having sold at \$8 and 72-hr. foundry at \$10 per net ton at ovens. These are the lowest prices reached on prompt coke in some time.

Pig Iron.—Very large lots of basic have been sold at \$35 at Valley furnace, while Bessemer iron has sold in good-sized quantities at \$38. Some sellers are now holding for \$40 for Bessemer and will not shade that price. A western Ohio open-hearth steel plant has bought 15,000 to 20,000 tons of basic iron for part of which it paid \$33 and \$34 while for 5000 tons \$35, Valley furnace, was paid. We also note a sale of 5000 tons of basic iron made a few days ago at \$34 at furnace and 15,000 tons this week at \$35, Valley furnace. The N. & G. Taylor Company is credited with having bought 4500 tons of basic last week from a local maker of iron at about \$33, furnace. No basic iron is available to-day at less than \$35 at furnace. There has been a fair movement in foundry iron for last half of year delivery at prices ranging from \$37 to \$38, at furnace. The whole pig-iron market seems to be in line for still higher prices in the very near future. Corrigan, McKinney & Co. have started No. 1 Josephine furnace at Josephine, Pa., and Scottdale furnace at Scottdale, Pa. All the blast furnaces of the Carnegie Steel Company that were banked for want of coke are again in blast, but it has 12 stacks idle undergoing repairs. We now quote standard Bessemer iron at \$38 to \$40; basic, \$35; malleable Bessemer, \$36 to \$37; No. 2 foundry, \$38 to \$40, and gray forge \$34 to \$35, the freight rate to the Pittsburgh and Cleveland districts being 95c. per ton.

Billets and Sheet Bars.—It is not believed that any soft Bessemer or open-hearth billets or sheet bars could be bought in the open market at less than \$70 per ton at mill, and the supply is limited even at this extraordinary price. In fact, a sale is reported of 1500 tons of soft open-hearth sheet bars at \$72.50, maker's mill, shipments at convenience of the mill. A local steel

concern recently sold from stock close to 700 tons of odds and ends in carbons ranging from 0.60 to 0.80 per cent at \$80 per gross ton at mill. We also note a sale of 1500 tons of discard steel at \$41, delivered, the steel netting the mill about \$39. If the Government starts to place orders for steel, it is held that much higher prices are bound to come. We now quote soft Bessemer and open-hearth billets and sheet bars at \$70 to \$75 per ton, maker's mill, Pittsburgh or Youngstown; forging billets, \$95 to \$100 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25.

Ferroalloys.—There is still a fairly heavy demand for ferromanganese both for prompt delivery and also for shipment over the next three or four months. We note a sale of 250 tons of 80 per cent domestic ferromanganese to a western Ohio open-hearth steel maker at about \$315 per ton delivered. For English 80 per cent, nominal prices are \$185 to \$200, seaboard, but with no promise of delivery. Some consumers are making the domestic purchases to protect themselves should shipments of the English material not be made promptly. We now quote domestic 80 per cent ferromanganese for prompt shipment at \$315 to \$325 per ton delivered. We quote 18 to 22 per cent spiegeleisen at \$70 to \$75, and 25 to 30 per cent at \$80 to \$85, delivered. We quote 9 per cent Bessemer ferrosilicon at \$54; 10 per cent, \$55; 11 per cent, \$57; 12 per cent, \$60; 13 per cent, \$65; 14 per cent, \$70; 15 per cent, \$75; and 16 per cent, \$80. A sale of 4000 tons of 9 per cent was made at \$54, extended delivery. We quote 7 per cent silvery iron at \$46 to \$47; 8 per cent, \$47 to \$48; 9 per cent, \$49 to \$50; 10 per cent, \$50 to \$51; and 11 and 12 per cent, \$52 to \$53, all f.o.b. at furnace, Jackson or New Straitsville, Ohio, and Ashland, Ky., these furnaces having uniform freight rates of \$2 per gross ton for delivery in the Pittsburgh district.

Structural Material.—In spite of the very high prices ruling on steel shapes, new demand is still quite heavy. The American Bridge Company has taken 1700 tons for a gas producer house for the Pittsburgh Steel Company at Monessen, Pa., and 1600 tons for a hotel extension

at Cleveland for the Terminal Properties Company; the McClintic-Marshall Company, 500 tons for a machine shop at the Mare Island Navy Yard, and the Riverside Bridge Company, 250 tons for the National Screw & Bolt Company, Cleveland. We quote beams and channels up to 15 in. at 3.60c. to 3.75c. for extended delivery, while small lots from warehouse are quoted at 4.25c. to 5c., depending on quantity.

Plates.—There is no let-up in the pressure on the mills, not only for the shipyards but for steel cars. Nearly all mills are quoting 5c. to 6c. on $\frac{1}{4}$ -in. and heavier sheared plates, while on ship plates prices up to 7c. and higher are being quoted. Very few orders for steel cars are being placed, and new inquiry is light. The Standard Steel Car Company has taken 20 steel dump cars for the Carnegie Steel Company, and the Chicago & Northwestern Railroad is in the market for 2000 steel underframe and steel side-frame gondola cars. We note a sale of 1000 tons of $\frac{1}{4}$ -in. and heavier sheared plates at 5.25c., and two sales of 500 tons each at 5.50c. at mill for delivery in the latter part of second quarter. We quote ship plates at 6c. to 7c. at mill, and $\frac{1}{4}$ -in. and heavier sheared plates from 5c. up to 5.75c. at mill, prices depending on the quantity and the deliveries wanted. On small lots for prompt shipment from stock, sheared plates are bringing 6c. and higher.

Steel Rails.—Only small routine orders are being placed for standard sections, but the new demand for light rails is fairly heavy from the coal mine interests, and specifications against contracts are coming in freely. We quote splice bars at 2.75c. at mill when sold in connection with orders for standard section rails, while for carloads and smaller lots up to 3c. and 3.25c. is quoted. We quote light rails as follows: 25 to 45 lb., \$55; 16 to 20 lb., \$56; 12 and 14 lb., \$57; 8 and 10 lb., \$58; in carload lots, f.o.b. mill, with the usual extras for less than carloads. Standard section rails of Bessemer stock are held at \$38, and open-hearth \$40, per gross ton, Pittsburgh.

Sheets.—It is very probable that during the week of April 2 the American Sheet & Tin Plate Company will announce its prices on blue annealed, Bessemer, black and galvanized sheets for third-quarter delivery, and perhaps over the entire second half. This company is being importuned by many of its customers to name prices for the third quarter. New demand continues heavy, and high prices are being paid for fairly prompt delivery. Sales of blue annealed sheets have been made as high as 5.25c. and 5.50c., while Bessemer black, No. 28 gage, have sold as high as 5.75c. at mill. These, however, are exceptional prices and are above what are regarded as a general market. It is not unlikely that within a short time a general advance will be made on all grades of sheets for second and third quarter shipments. We quote blue annealed sheets, Nos. 3 to 8, at 5c. to 5.25c.; box annealed, one pass Bessemer cold-rolled, No. 28, 5c. to 5.50c.; No. 28 galvanized, 6.75c. to 7.50c.; No. 28 black plate, tin-mill sizes, 4.75c. to 5c., all f.o.b. mill, Pittsburgh. These prices are for carloads and larger lots for shipment over the next three or four months. Mills that can ship out in four to six weeks readily get premiums over these prices.

Tin Plate.—Last Saturday, March 24, a conference was held in Washington, D. C., by Secretary of Commerce Redfield, Secretary of Agriculture Houston, and practically all of the leading tin-plate manufacturers. The conference was called by the Government officials to find out from the makers just how serious the shortage is in tin-plate supplies, and also what the prospects are for the tin-plate makers to supply the enormous demand. It developed at the meeting that the demands of the can makers this year are abnormally heavy, and that while the output of tin plate in 1917 is estimated at 5,000,000 boxes larger than in 1916, yet there is the fear of a shortage. One proposition made by the tin-plate makers was that they might, under pressure, operate their mills seven days a week, getting out 20 turns per week, instead of the maximum 16 as at present. There has not been much trouble so far in getting pig tin promptly, but scarcity of tin may also occur, and this was referred to as a factor. A commit-

tee was appointed, consisting of J. I. Andrews, chairman, who is the general sales manager of the American Sheet & Tin Plate Company; E. T. Weir, president Phillips Sheet & Tin Plate Company, and E. R. Crawford, president McKeesport Tin Plate Company, to gather data and co-operate with the Government officials and take care of Government needs, especially if war should be declared. With the mills running at the highest pressure possible, they are utterly unable to meet the demand as fast as consumers would like. It is probable that in the week of April 2, possibly April 5 or 6, the price of tin plate for the second-half delivery will be announced, and the belief is it will not be above \$7.50 per base box, although some makers feel that the market fully warrants \$8 for second-half delivery. Nearly all the tin-plate makers have their output sold up for this year, and are turning down both foreign and domestic orders nearly every day. It is impossible to buy any tin plate, either wasters or primes, at less than \$8, and several sales of export tin plate have been made at \$8.50 and even \$8.75 per base box. For current orders, we quote primes and wasters at \$8 to \$8.25 per base box at mill. We quote long-terne plate, No. 28 gage base, at \$7 to \$7.50; short-terne plate, \$11.50 to \$12.50, maker's mill, prices depending on quantity and deliveries wanted.

Shafting.—Most makers are now quoting on large contracts 10 to 15 per cent off list, and one leading maker is quoting 5 per cent off list. Most consumers are covering over second and third quarters, and some have practically the entire year. Specifications are active, and the output on shafting is well sold up over the next three or four months. Two or three makers who recently increased capacity can ship out on small orders in about three months from date of order. We now quote cold-rolled shafting from 5 to 10 per cent off list, but to a few large customers some makers might quote 15 per cent off.

Railroad Spikes and Track Bolts.—While the advance on spikes is reported as holding firm, few orders so far have been placed at the new prices. Most of the railroads have covered up to July and some have bought for a more extended period at lower figures. Specifications against contracts are fairly active. New demand for track bolts are also reported more active. We now quote track bolts with square nuts at 5c. to 5.10c. to railroads, and 5.25c. to 5.35c. in small lots to jobbers, base. Railroad spikes, 9/16 in. and larger, are now \$3.65, base; 7/16 and $\frac{1}{2}$ in., \$3.75 base; 5/16 and $\frac{3}{8}$ in., \$4 base. Boat spikes are \$3.90 base, all per 100 lb., f.o.b. Pittsburgh.

Wire Products.—New demand for wire and wire nails continues abnormally heavy, and sales have been made at prices from \$2 to \$3 per ton higher than the ruling price. There is a heavy export demand, but local makers say they are turning most of this business away, needing their entire output for domestic customers. Several makers are refusing to take contracts for delivery more than 60 days ahead and these only from regular customers. It is estimated that there will be another advance in price on nails and wire within a very short time. We quote: Wire nails, \$3.20 base per keg; galvanized, 1 in. and longer, including large-head barb roofing nails, taking an advance over this price of \$2.20, and shorter than 1 in. \$2.70. Bright basic wire is \$3.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.15; galvanized wire, \$3.85; galvanized barb wire and fence staples, \$4.05; painted barb wire, \$3.35; polished fence staples, \$3.35; cement-coated nails, \$3.10 base, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 51 per cent off list for carload lots, 50 per cent off for 1000-rod lots, and 49 per cent off for small lots, f.o.b. Pittsburgh.

Wire Rods.—Sales of soft Bessemer rods have been made for export at as high as \$85 per ton at mill, while high-carbon rods have sold as high as \$100 and acid high-carbon open-hearth rods have sold at \$115, and possibly as high as \$125 per ton. It is stated that a leading interest has recently taken care of the re-

quirements of its chain trade in soft rods at a price much under \$75 per ton. Most makers are refusing to quote on inquiries for rods, conserving output for their own wire mills. We quote soft Bessemer open-hearth and chain rods at \$85, and high-carbon rods at \$100 to \$115 per ton, prices on the latter depending entirely on the carbons and the quality of steel demanded.

Iron and Steel Bars.—Reports are denied that some of the implement makers were allowed to contract for steel bars for deliveries running into 1918. Specifications against contracts are active, and the output of steel bars is well sold up for this year. There is only a fair demand for reinforcing bars, although this has been increased to some extent by the fact that concrete has been substituted in many cases for steel in building work. There is a heavy demand for iron bars. The three local mills that roll these report they are well sold up for three or four months to come. We quote steel bars at 3.35c. at mill, with no promise of definite delivery, and 3.50c. to 3.75c. for shipment in two to three months. We quote refined iron bars at 3.50c. and railroad test bars 3.65c. at mill in carload lots.

Cold-Rolled Strip Steel.—The new demand for early delivery is moderate. Some large users are importuning the mills to enter their orders for the third quarter and some for the entire last half of the year, but so far none will sell for delivery beyond the second quarter. Specifications against contracts are active, and the output of the makers is well sold up over the first half. For second-quarter delivery we quote cold-rolled strip steel at \$7 to \$7.25 per 100 lb. on current orders. For reasonably prompt shipment mills are getting \$7.25 to \$7.50 and higher. Terms are 30 days net, less 2 per cent for cash in 10 days, delivered in quantities of 300 lb. or more when specified for at one time.

Nuts and Bolts.—As yet no change has been made in prices. Some makers say that prices are high enough, while others claim that owing to the very high cost of steel bars and higher costs in other ways, an advance in nuts and bolts is imperative. Some export sales are being made, but these are few, however, as local makers desire to retain their entire output for shipment to domestic consumers. Recent export shipments were to India, China and South America. Discounts in effect at this writing are as follows, delivered in lots of 300 lb. or more, when the actual freight rate does not exceed 20c. per 100 lb., terms 30 days net, or 1 per cent for cash in 10 days:

Carriage bolts, small, rolled thread, 40 and 10 per cent; small, cut thread, 40 and 2½ per cent; large, 30 and 5 per cent.

Machine bolts, h. p. nuts, small, rolled thread, 50 per cent; small, cut thread, 40 and 10 per cent; large, 35 and 5 per cent.

Machine bolts, c. p. c. and t. nuts, small, 40 per cent; large, 30 per cent. Bolt ends, h. p. nuts, 35 and 5 per cent; with c. p. nuts, 30 per cent. Lag screws (cone or gimlet point), 50 per cent.

Nuts, h. p. sq. and hex., blank, \$2.50 off list, and tapped, \$2.30 off; nuts, c.p.c. and t. sq., blank, \$2.10 off, and tapped, \$1.90 off; hex., blank, \$2.25 off, and tapped \$2 off. Semi-finished hex. nuts, 50, 10 and 5 per cent. Finished and case-hardened nuts, 50, 10 and 5 per cent.

Rivets 7/16 in. in diameter and smaller, 40 and 10 per cent.

Rivets.—The new demand is good, but most consumers are covered to July and some over the third quarter. Export demand is also heavy, and considerable shipments have lately been made to South Africa, India and Japan. Makers quote buttonhead structural rivets, ½ in. in diameter and larger, \$4.75 per 100 lb., base, and conehead boiler rivets, same sizes, \$4.85 per 100 lb., base, f.o.b. Pittsburgh. Terms are 30 days net, or ½ of 1 per cent off for cash in 10 days.

Wrought Pipe.—An insistent heavy demand is coming out for line pipe from gas and oil interests, but the mills are so crowded with orders that they cannot promise deliveries on such pipe until late this year. A leading mill has taken 80 miles of 4-in line pipe for a Western oil interest for delivery over the next four or five months. On lap-weld iron and steel pipe the mills are pretty well sold up for all of this year, but on butt-weld sizes can make deliveries in 8 to 10 weeks. Oil-country goods are in heavy demand. The announce-

ment on Monday, March 26, by the Wheeling Steel & Iron Company that it had advanced its prices on all sizes and classes of black and galvanized pipe approximately \$10 per net ton, and had withdrawn quotations on line pipe and oil-country goods, is regarded as the forerunner of a similar advance by all other makers. Discounts of other makers are given on another page.

Hoops and Bands.—Although most large consumers are covered over the second and third quarters, and a few over the entire year, the demand is quite good. The minimum price on steel bands is 3.35c., this being quoted by the Carnegie Steel Company, but with no definite promise of delivery. Other makers are quoting as high as 3.50c. for shipment in the second and third quarters. Prices on steel hoops range from 3.75c. to 4c., and in some cases as high as 4.25c. at mill is quoted.

Boiler Tubes.—A famine now exists in the supply of both iron and steel boiler tubes, and users are compelled to pay heavy premiums over what are regarded as regular prices for reasonably prompt shipment. Mills are sold up for all of this year, and some of the larger makers have orders on their books for delivery early in 1918. In seamless steel tubes the situation as regards deliveries is worse, one leading maker reporting its output sold up to July 1, 1918, while another cannot promise any delivery before next year. Nominal discounts, which have been unchanged since November, 1916, but which do not represent actual market prices, are given on another page.

Old Material.—There has been a sharp advance on nearly all grades of iron and steel scrap, some being up \$3 to \$4 per ton. Selected grades of steel scrap are scarce, and the heavy advances in prices of basic pig iron have pulled prices of scrap up with them. The local scrap market is not very active, but the demand is heavy in other scrap consuming centers, such as Sharon, Youngstown, Cleveland and Canton. Much of the buying in the past week or more has been done by consumers in those districts. We note sales of 10,000 to 12,000 tons of selected heavy steel scrap at \$24 to \$27, delivered to buyers' mills in the Youngstown and Canton districts and quite large sales in the Youngstown district at \$26 to \$27, delivered. Prices on low-phosphorus melting stock are up \$2 to \$3 per ton, and borings and turnings are up \$1 or more. We note a sale of 1250 tons of low-phosphorus melting scrap at \$35, delivered to consumer's mill in the Pittsburgh district. The embargo on scrap routed to the Pittsburgh Steel Company, Monessen, Pa., has been lifted, but there is still an embargo on the city mills of the Jones & Laughlin Steel Company. Indications are strong that the market will go still higher. Prices for delivery in Pittsburgh and other consuming points that take Pittsburgh freight rates, per gross ton, are nominally as follows:

Heavy melting steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh, delivered.....	\$27.00 to \$28.00
No. 1 foundry cast.....	23.00 to 24.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	28.00 to 29.00
Hydraulic compressed sheet scrap....	20.00 to 20.50
Bundled sheet scrap, sides and ends, f.o.b. consumers' mills, Pittsburgh district	17.00 to 17.50
Bundled sheet stamping scrap.....	14.00 to 14.50
No. 1 railroad malleable stock.....	23.00 to 23.50
Railroad grate bars.....	15.00 to 15.50
Low phosphorus melting stock.....	35.00 to 36.00
Iron car axles.....	41.00 to 42.00
Steel car axles.....	52.00 to 55.00
Locomotive axles, steel.....	55.00 to 60.00
No. 1 bushelling scrap.....	22.00 to 22.50
Machine-shop turnings.....	12.50 to 13.00
Old carwheels	22.00 to 23.00
Cast-iron borings	13.50 to 14.00
*Sheet bar crop ends.....	28.00 to 29.00
No. 1 railroad wrought scrap.....	28.00 to 29.00
Heavy steel axle turnings.....	16.00 to 17.00
Heavy breakable cast scrap.....	20.50 to 21.00

*Shipping point.

Coke.—Prices on prompt coke continue to decline, due to better car service and a larger output. On Monday, March 26, there were fairly heavy sales of high-grade prompt furnace coke at \$8.25 to \$8.50 per net ton at oven. It is probable, however, that prompt furnace coke on a firm offer could now be bought as

low as \$8. Prices on prompt 72-hr. foundry coke are also lower, best grades having sold in the last few days at \$10 oven or lower. The new demand for prompt furnace and foundry coke is not active as shipments on contracts are much heavier now than for a long time. We quote best grades of prompt furnace coke at \$8 to \$8.25, and prompt 72-hr. foundry coke at \$10 per net ton at oven. Practically no contracts are being made, as consumers refuse to pay the high prices quoted by producers. The Connellsville *Courier* gives the output of coke in the Upper and Lower Connellsville regions for the week ended March 17 as 358,079 net tons, an increase over the previous week of 8875 net tons.

Chicago

CHICAGO, ILL., March 27, 1917.

Prospective Government demands, already indicated to the mills, promise to make the steel market more than ever a vexing problem for those who would buy raw, finished or semi-finished products. It is conceded that production has reached its zenith, even including the additional capacity nearing completion, as much of the latter will simply replace equipment which must rest for repairs after the heavy strain of the past two years. Leading steel men do not anticipate that the shortage of steel will be relieved by the backing up of exports as a result of the lack of transatlantic carriers. Despite the inadequate supply of ships, the foreign governments do not want American steel manufacturers to cease piling up material for them. They expect to have the vessels eventually; meanwhile the plan is to store material at seaboard points, an arrangement having been made whereby a charge of 35c. per ton is to be made for unloading and storing for 60 days, with an additional charge of 5c. per ton for each month thereafter. Doubt as to cost of material in the second half of the year is causing the makers of many products, including bolts and nuts, sheets, etc., to withhold announcement of their price policies until they learn the terms of the contracts they must enter. Pig iron is more difficult than ever to procure, and prices show further advances. Some Northern iron has been sold for 1918 delivery, following the lead of Virginia and Southern irons. Cast-iron pipe is on the verge of another advance. Old material is stronger.

Pig Iron.—The spot market has not been so active with some interests in the past week, but only for the reason that less iron is to be had. Southern iron is exceedingly difficult to procure, either by reason of the sold-up condition of the producers or their policy with regard to selling in the face of such a strong outlook. One of them has been unable to figure on inquiries aggregating about 30,000 tons. Another has no iron to offer until the fourth quarter. While some last quarter Alabama iron can possibly be had around \$30, Birmingham, those looking for nearer delivery find \$32 to be the minimum for No. 2. One local interest has advanced its quotation for malleable Bessemer, its price now being on the basis of \$38, South Chicago. Northern No. 2 foundry is also quoted at \$38, f.o.b. furnace, likewise basic, although it is probable that not all the producers would turn down business at a little below this quotation. Heretofore most of the inquiry for 1918 delivery has been tentative in character, but in the past week several consumers have shown that they mean business by placing orders for early 1918. One block of 3000 tons of Southern foundry has been taken for first-half delivery at a price over \$30, Birmingham. The leading Virginia producer has sold a considerable tonnage for the next year, its later sales having been on the basis of \$33, furnace, or \$36.35, Chicago. Some Northern iron has been taken for 1918, probably the first that has been placed for that delivery. The price for 1918 delivery of Northern is not yet at a fixed level, but it promises to take form within a few days in view of the growing interest. It can be said that the business taken was at a little below the present market. An interesting inquiry calls for 1500 tons of silvery iron, delivery August to November, at South Bend, Ind. A moderate amount of inquiry for standard low phosphorus is out. The last sale made for delivery in this

territory was on the basis of \$60, Eastern furnace, to which must be added a freight rate of approximately \$2.50, but it is felt that the market is now stronger. Lake Superior charcoal iron is exceedingly strong, with numerous inquiries for first half, and several sales have been made of grades 1 to 5 on the basis of \$37, furnace, equivalent to \$38.75, Chicago, for delivery in first half. There is considerable iron yet to be purchased for this year, with only about two months' product available to supply that demand. The minimum quoted by one seller of Lake Superior charcoal, Nos. 2 to 5, is \$37, furnace, or \$38.75, delivered. A maker of silvery asks \$44, furnace, or \$46.50, Chicago. A sale of prompt shipment resale high-silicon Southern iron was made at \$34, Birmingham, and the seller is now wondering if he did not let it go too cheap. Reverting to Northern foundry iron, it may be said that there is a good run of inquiry for last half, but no excessively large inquiries. Spot domestic 80 per cent ferromanganese is firm at \$300, for the remainder of the year. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, Nos. 2 to 5.....	\$38.75
Lake Superior charcoal, No. 1.....	39.25
Lake Superior charcoal, No. 6 and Scotch	40.25
Northern coke foundry, No. 1.....	38.50
Northern coke foundry, No. 2.....	38.00
Northern coke foundry, No. 3.....	37.50
Northern high-phosphorus foundry.....	36.00 to 37.00
Southern coke No. 1 f'dry and 1 soft.....	37.00
Southern coke No. 2 f'dry and 2 soft.....	36.00
Malleable Bessemer	38.00
Basic	38.00
Low phosphorus	62.50
Silvery, 8 per cent	46.50
Bessemer ferrosilicon, 10 per cent.....	50.00

Rails and Track Supplies.—The railroads which purchase in this market are generally covered in regard to their requirements of rails, spikes and tie-plates. Tie-plates are now believed to be firmly established at the recently fixed price of \$60. Quotations are as follows: Standard railroad spikes, 3.60c. to 3.70c., base; track bolts with square nuts, 4.60c. to 4.70c., base, all in carloads, Chicago; tie-plates, \$60, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, \$38, base; open-hearth, \$40; light rails, 25 to 45 lb., \$52; 16 to 20 lb., \$53; 12 lb., \$54; 8 lb., \$55; angle bars, 2.25c.

Structural Material.—Only a few, and, for the most part, small contracts, for fabricated work were placed last week, the largest specifying 654 tons for a packing house at Crockett, Cal., for the California Hawaiian Sugar Company, which will be supplied by the Pacific Rolling Mill Company. Next in importance is a concrete and steel viaduct at Portland, Ore., requiring 626 tons, taken by the American Bridge Company, which also will furnish miscellaneous material amounting to 108 tons for a building at Anderson, Ind., for the American Steel & Wire Company, and 1500 automobile frames aggregating 197 tons, for the Commercial Truckmobile Company, Chicago. The demand from fabricators for second-half delivery is strong, but the mills have yielded only occasionally in regard to booking orders. It is apparent that while the contracts sought are, on their face, for last-half delivery, actual delivery will be in the first half of 1918. Plain material, delivery at the mill's convenience, is unchanged at 3.789c., Chicago. The high cost of material is having an apparent effect in limiting car buying, and orders are mostly insignificant. An exception in the matter of sizable inquiries is one from the Chicago & Northwestern for 2000 gondolas.

We quote for Chicago delivery of structural steel out of jobbers' stocks, 4.25c.

Plates.—The nominal quotation for Chicago delivery of plates from mill, at its convenience, is 4.689c. For prompt shipment, in widths up to 72 in., 5.189c. to 5.659c. is quoted, and for wide plates 5.689c. to 6.189c. At the premium levels a limited tonnage is available, despite the fact that some of the mills reiterate that they are out of the market for the remainder of the year. The carbuilders, as heretofore stated, find material at a point which restricts their business. The for-

Foreign demand continues heavy, with Japanese buyers especially active.

We quote for Chicago delivery of plates out of jobbers' stocks, 5.50c.

Sheets.—The scarcity of steel is making for higher prices, although in a general way quotations are unchanged from a week ago, with galvanized sheets the more difficult to procure, one prominent mill not quoting at all. For a lot of 100 tons of wide galvanized sheets 7.25c. was paid. We quote for Chicago delivery, No. 10 blue annealed, 5c. to 5.50c.; box annealed, No. 16 and lighter, 5.25c., and for No. 28 galvanized, 6.75c. to 7.50c.

We quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 5.50c.; No. 28 black, 5.65c.; No. 28 galvanized, 7.75c.

Bars.—Leading producers are out of the market so far as this year is concerned, and their nominal quotation for next year is 3.35c., Pittsburgh, for mild steel. Interest has been manifested as to whether the agricultural-implement makers had purchased into 1918, and in relation thereto it is stated that when these buyers placed contracts at 3c., Pittsburgh, it was with the understanding that they would specify to the full extent in the last half, but that shipment would run into the following year. We quote mill shipment, Chicago, as follows: Bar iron, 3.10c. to 3.25c.; soft steel bars, 3.539c. to 3.689c.; hard steel bars, 3.25c.; shafting, in carloads, 20 per cent off; less than carloads, 15 per cent off.

We quote prices out of store for Chicago delivery as follows: Soft steel bars 4c.; bar iron, 4c.; reinforcing bars, 4c., base, with 5c. extra for twisting in sizes $\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting 1st plus 5 per cent.

Rivets and Bolts.—A revision of bolt and nut discounts will be effective in the near future, but it cannot be announced until the makers are fully informed, as they will be in a short time, as to what their costs for material will be in the last half. That they will have to pay more than they did for the rods, etc., with which they are now operating is unquestioned. We quote as follows: Carriage bolts up to $\frac{3}{4}$ x 6 in., rolled thread, 40-10; cut thread, 40-2 $\frac{1}{2}$; larger sizes, 30-5; machine bolts up to $\frac{3}{4}$ x 4 in., rolled thread, with hot pressed square nuts, 50; cut thread, 40-10; large size, 35-5; gimlet-point coach screws, 50; hot pressed nuts, square, \$2.50 off per 100 lb.; hexagon, \$2.60 off. Structural rivets, $\frac{3}{4}$ to 1 $\frac{1}{4}$ in., 4.75c. to 4.939c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

Store prices are as follows: Structural rivets, 4.75c.; boiler rivets, 4.85c.; machine bolts up to $\frac{3}{4}$ x 4 in., 40-10; larger sizes, 35-5; carriage bolts up to $\frac{3}{4}$ x 6 in., 40-2 $\frac{1}{2}$; larger sizes, 30-5; hot pressed nuts, square, \$3. and hexagon, \$3 off per 100 lb.; lag screws, 50.

Cast-Iron Pipe.—Users of cast pipe are buying only as they are compelled to obtain material. Although prevailing prices are staving off business, the pipe manufacturers can pursue but one course, and that is to advance their quotations as the price of pig iron mounts to higher levels. Kalamazoo, Mich., is about to let 150 tons, and La Crosse, Wis., is inquiring for 350 tons. We quote as follows, per net ton, Chicago: Water pipe, 4-in., \$48.50; 6-in. and larger, \$43.50, with \$1 extra for class A water pipe and gas pipe.

Wire Products.—Little can be said except that there is a good healthy demand in every direction, a possible exception being galvanized barb wire, the farmers now turning their attention to planting rather than fencing. We quote to jobbers as follows, per 100 lb.: Plain fence wire, Nos. 6 to 9, base, \$3.339; wire nails, \$3.389; painted barb wire, \$3.539; galvanized barb wire, \$4.239; polished staples, \$3.539; galvanized staples, \$4.239, all Chicago.

Old Material.—Cast scrap is strong and active, because of the shortage of pig iron, and an advance of \$1 per ton is considered conservative. In a general way the market shows greater strength, although with the approach of spring, which should accelerate the already easier movement of cars, conditions are expected to become less acute. Meanwhile several advances of 50c. to \$1 per ton are recorded. Railroad offerings are more numerous, among those of the week being 4100 tons

by the Rock Island, 2000 tons by the Burlington, 500 tons by the Pere Marquette, and 600 tons by the Monon. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$28.00 to \$29.00
Relaying rails	34.00 to 35.00
Old carwheels	22.00 to 22.50
Old steel rails, rerolling	30.00 to 31.00
Old steel rails, less than 3 ft.	27.50 to 28.00
Heavy melting steel scrap	25.00 to 25.50
Frogs, switches and guards, cut apart	25.00 to 25.50
Shoveling steel	21.50 to 22.00
Steel axle turnings	15.50 to 16.00

Per Net Ton	
Iron angles and splice bars	\$29.00 to \$29.50
Iron arch bars and transoms	29.50 to 30.00
Steel angle bars	25.50 to 26.00
Iron car axles	37.00 to 38.00
Steel car axles	38.00 to 39.00
No. 1 railroad wrought	27.50 to 28.00
No. 2 railroad wrought	25.50 to 26.00
Cut forge	25.50 to 26.00
Pipes and flues	15.50 to 16.00
No. 1 busheling	17.75 to 18.25
No. 2 busheling	13.50 to 14.00
Steel knuckles and couplers	25.50 to 26.00
Steel springs	26.50 to 27.00
No. 1 boilers, cut to sheets and rings	16.00 to 16.50
Boiler punchings	21.00 to 21.50
Locomotive tires, smooth	36.00 to 36.50
Machine-shop turnings	9.50 to 10.00
Cast borings	10.00 to 10.50
No. 1 cast scrap	18.25 to 18.75
Stove plate and light cast scrap	12.50 to 13.00
Grate bars	13.50 to 14.00
Brake shoes	13.50 to 14.00
Railroad malleable	18.50 to 19.00
Agricultural malleable	16.50 to 17.00

Philadelphia

PHILADELPHIA, PA., March 27, 1917.

Manufacturers of iron, steel and machinery in the Philadelphia district are preparing to do their full part in meeting any demands that may come from the Government in connection with the expected war with Germany. Some companies which have steadfastly refused to take orders for war material for export will, it is believed, not hesitate to take orders for the United States Government. A representative of a very large plate manufacturing concern when asked whether it would take orders for plates for American battleships replied: "We do not seek this business, but we are patriotic and the Government can take possession of our plant if it desires to do so." It is not thought, however, that it will be necessary for the Government to commandeer any plants for the reason that manufacturers will gladly meet the needs of the War and Navy departments. Up to the present time, the volume of business coming from the Government is not large, but the demand for early delivery is insistent and some confusion has arisen, as it is evident in some cases the various departments at Washington have not carefully formulated their plans and do not know exactly what they will need. The market in general is very strong, and still higher prices are expected. At a meeting of pig-iron manufacturers held Monday to discuss business conditions, it was predicted that pig-iron prices will be much higher, but there was some difference of opinion in regard to basic, some believing that it will be marked up at a not far distant date to \$40, while others do not expect such a rapid advance. Information from Pittsburgh confirms the statement made last week that the supply of basic has been augmented by a steel company in that district whose consumption in its open-hearth furnaces did not demand all of its pig-iron product, but it is added that two other steel companies have been in a similar condition. It is not believed that the companies referred to have any more basic for sale, and higher prices on this grade are likely.

Pig Iron.—The Lukens Steel Company last week purchased 1500 tons additional of basic, making its entire purchases, including those reported in the preceding two weeks, 60,000 tons, at an average price of \$33.80 delivered. Another eastern Pennsylvania steel manufacturer purchased 3700 tons of basic and 500 tons of charcoal, and still another company purchased 5000 tons of basic at a shade above \$35, furnace, for delivery the last half of this year. The foundry-iron market continues extremely strong. A large number

of sales have been made, aggregating a large tonnage, but no single sale stands out as of special importance. The most notable development in foundry grades has been an inquiry from the Pennsylvania Railroad for 9000 tons of various foundry grades and some tonnage of charcoal for delivery during the last half of this year at Altoona. It is predicted that this iron will be placed on a basis of about \$40, delivered, for No. 2 X. Sales are being made regularly at \$40, and in some cases higher has been paid. Virginia iron continues strong with \$33, furnace, as a minimum for the first half of 1918 and \$38.75, delivered, as the prevailing quotation for this year. Alabama iron is quiet with \$30, Birmingham, for No. 2 foundry as the minimum. Low phosphorus is in active demand, but the supply is limited, and the usual quotation for either standard or copper-bearing product is \$70, furnace. Quotations for standard brands delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Pa. No. 2 X foundry.....	\$39.00 to \$40.00
Eastern Pa. No. 2 plain.....	38.50 to 39.00
Virginia No. 2 X foundry.....	38.25 to 38.75
Virginia No. 2 plain.....	38.25 to 38.75
Gray forge.....	33.25 to 33.75
Basic.....	35.00 to 36.00
Standard low phosphorus.....	65.00 to 70.00

Iron Ore.—Much interest is felt as to the probable supply of manganese ore for the remainder of this year. It is known that there are very large accumulations of this ore which would be shipped from the Caucasus if anything should happen to make it possible to ship through the Dardanelles, but there seems to be no prospect of the early opening of that passageway. It is believed that, with the return of spring, mining operations in Virginia will improve and soon show a considerable increase in shipments of manganese ore. There were no ore receipts from Spain or Cuba last week.

Ferroalloys.—The foreign manufacturers of ferromanganese are now entirely out of the market. Deliveries are being made on contracts and 690 tons were received in Philadelphia from England last week, but, owing probably to the attitude of the British Government, no English ferromanganese is now being offered for sale. Spot domestic is still quoted at \$300, delivered, and some sellers are asking the same price for third and fourth quarter, but it is understood that some can still be had for the last half of the year for \$280.

Structural Material.—In spite of the fact that many building projects are still being held up, the demand for structural shapes is very active, and the 3.75c., Pittsburgh, quotation which has been the lowest named by any company except the Carnegie Steel Company, which quotes 3.60c., Pittsburgh, for delivery at convenience of the mill, is rapidly vanishing. Very little attention is being paid to inquiries from foreign lands, as mills feel that they cannot spare very much tonnage for export. The Strawbridge & Clothier storehouse at Philadelphia, requiring 700 tons, has been taken by the American Bridge Company. Bids on the machine shop to be built at the Philadelphia Navy Yard will be received March 31. Not less than 1600 tons will be required, and an alternative proposition calls for 3350 tons.

Plates.—The demand from every direction for plates are now described as "simply overpowering." Mills report it impossible to make any deliveries in spite of the fact that they have been very conservative in taking on new business. A leading company has made another advance of \$10 per ton on all grades, making the quotation on tank steel 6.659c., base, Philadelphia. A large order for this kind of steel for domestic use was placed at 8c., base, for shipment in 60 days. An order for about 1000 tons of heavy plates for shipment in the first quarter of next year was taken by an Eastern mill at 6.50c., base. Shipbuilders are still coming into the market for large tonnages, one inquiry being for 9000 tons for delivery during the first half of 1918 and another for 10,000 tons of plates for four cargo boats. Two Pacific coast shipyards are inquiring for 20,000 tons of ship plates for delivery during 1918, on which it is understood no quotation was made. The two Cunard Line boats placed with the Baltimore Dry Dock & Shipbuilding Company will require about 3000

tons of plates for 1918 shipment. The Newport News Shipbuilding & Dry Dock Company has another contract for two vessels of 7500 tons capacity each for delivery in the fall of 1918. The Chicago & Eastern Illinois Railroad is in the market for seven locomotives of the Santa Fe type. Quotations by leading independent companies are 6.659c., Philadelphia, for tank plates, 8.159c. for ship plates, 9.659c. for Lloyd's boiler steel and 16.059c. for marine boiler steel. It is probable, however, that orders still can be placed with some independents on the basis of 6.159c., Philadelphia, for tank plates, and the Carnegie Steel Company continues to quote on a basis of 4.50c., Pittsburgh.

Billets.—Inquiries are not numerous, probably because consumers are discouraged owing to the limited supply available. Rerolling billets are quoted at \$65 to \$70 and forging billets from \$90 to \$100. Little attention is being paid to foreign inquiries.

Bars.—Steel bars are strong, with 3.75c., Pittsburgh, or 3.909c., Philadelphia, becoming the general quotation. The Carnegie Steel Company's quotation continues 3.35c., Pittsburgh. Bar iron is selling at 3.50c., Pittsburgh, or 3.659c., Philadelphia, and the demand is fully equal to the supply.

Sheets.—Rush orders for considerable tonnages of sheets have been received from the Government. The manufacturers are doing their utmost to give prompt delivery, but in order to do this it is necessary to delay deliveries to other consumers. The minimum quotation for No. 10 blue annealed is 5.50c., Pittsburgh, or 5.659c., Philadelphia.

Coke.—The improvement in car supply is being reflected in a decided manner in easier conditions in the coke market and spot furnace has been sold as low as \$8.25 per net ton at oven. Spot foundry coke is about \$1 per ton higher than furnace grades. Freight rates from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

Old Material.—The market is strong and active, especially in heavy melting steel, wrought iron and carwheels. For heavy melting, \$25 is the usual quotation and an Eastern steel company has purchased from 2000 to 3000 tons at that figure. If there is any product that is weak, it is bundled sheets, which can be had at \$17 to \$18. Quotations covering eastern Pennsylvania, and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$24.50 to \$25.00
Old steel rails, rerolling.....	31.00 to 33.00
Low phos. heavy melting steel scrap..	34.00 to 35.00
Old iron and steel axles (for export) ..	43.00 to 45.00
Old iron rails.....	29.00 to 30.00
Old carwheels.....	23.00 to 24.00
No. 1 railroad wrought.....	33.00 to 34.00
Wrought-iron pipe.....	20.50 to 21.50
No. 1 forge fire.....	17.00 to 18.00
Bundled sheets.....	17.00 to 18.00
No. 2 busheling.....	13.50 to 14.50
Machine-shop turnings.....	14.50 to 15.50
Cast borings.....	15.50 to 16.50
No. 1 cast.....	23.00 to 24.00
Grate bars, railroad.....	17.00 to 17.50
Stove plate.....	18.00 to 18.50
Railroad malleable.....	18.00 to 18.50

Buffalo

BUFFALO, N. Y., March 27, 1917.

Pig Iron.—The week has shown a very large demand, and considerable buying has been done for the first half of 1918, including some good-sized contracts. The General Electric Company has, it is understood, bought a large tonnage of foundry grades for first-quarter delivery. Some furnaces are fighting shy of quoting on much iron for extended delivery into 1918, and are only giving consideration in this respect to old customers. They believe that higher prices than now prevailing will be obtainable later. In fact, it is only here and there that a furnace is soliciting business for next year. Inquiries aggregating several thousand tons of foundry and basic grades are reported for shipment to England and Italy. The ruling price for foundry irons for current and last-half delivery is \$40, furnace, with a range of \$39 to \$40 from the lower to the higher grades. The range for charcoal iron is from \$39, for delivery after the opening of navigation, to \$40, for spot delivery from stocks on hand at Buffalo docks.

There is very little charcoal iron left in stock. We quote for delivery to the end of the year, f.o.b. furnace, Buffalo, as follows:

High-silicon irons	\$39.00 to \$40.00
No. 1 foundry	39.00 to 40.00
No. 2 X foundry	39.00 to 40.00
No. 2 plain	39.00 to 40.00
No. 3 foundry	39.00 to 40.00
Gray forge	39.00 to 40.00
Malleable	39.00 to 40.00
Basic	39.00 to 40.00
Bessemer	39.00 to 40.00
Charcoal according to brand and analysis (high price for spot)	39.00 to 40.00

Finished Iron and Steel.—Conditions have developed to where prices are only nominal again, and the orders being placed are largely at prices in advance of the so-called regular quotations. Bars are moving at approximately 3.50c. to 3.75c., Pittsburgh; shapes, 3.75c. to 4c.; plates, 6c. to 6.50c. for ordinary tank quality. It is understood that large tonnages have been placed by the Imperial Munitions Board at Ottawa, acting in co-operation with the Canadian and British governments. The material ordered is to be used for the building of various types of vessels, and to be paid for by the munitions board, but to be forwarded to the various shipbuilding companies, which are, it is stated, to construct the vessels on a percentage of cost basis.

Old Material.—The market has taken a sudden upward course. Orders have been placed for large tonnages of heavy melting steel to be shipped to the Pittsburgh and Valley districts. Cast scrap and old carwheels are also in strong demand. The reverse of the waiting attitude displayed by buyers for the past few weeks is now in evidence. Users had believed the opening of spring would bring in an influx of scrap, and lower prices would result, but prices have gone up instead of down, and scrap, instead of being plentiful, is scarcer, and stock piles in dealers' yards have been cleared to a considerable extent. Indications point to a further rise in prices, and predictions are being made that heavy melting steel will go to \$30, Pittsburgh, within a very short time. Dealers' asking prices are as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	\$25.00 to \$25.50
Low phosphorus	33.00 to 36.00
No. 1 railroad wrought	28.00 to 29.00
No. 1 railroad and machinery cast	23.50 to 24.00
Iron axles	45.00
Steel axles	45.00
Carwheels	23.50 to 24.00
Railroad malleable	22.00 to 23.00
Machine shop turnings	11.00 to 11.50
Heavy axle turnings	17.00 to 17.50
Clean cast borings	12.00 to 12.50
Iron rails	25.00 to 26.00
Locomotive grate bars	15.50 to 16.00
Stove plate	16.00 to 16.50
Wrought pipe	16.00 to 16.50
No. 1 busheling scrap	20.50 to 21.50
No. 2 busheling scrap	13.00 to 13.50
Bundled sheet scrap	15.00 to 15.50

Cleveland

CLEVELAND, OHIO, March 27, 1917.

Iron Ore.—Shippers are anxious for an early opening of the season of navigation, but ice conditions in Lake Superior indicate that the start will be rather late. Ore is now moving from the Lake Erie docks at a fairly rapid rate. The market continues inactive. We quote as follows, delivered lower Lake ports: Old range Bessemer, \$5.95; Mesaba Bessemer, \$5.70; old range non-Bessemer, \$5.20; Mesaba non-Bessemer, \$5.05.

Pig Iron.—A very active buying movement in foundry pig iron, largely for the first half of 1918, has been in progress during the past few days. Malleable iron has shared in the activity to a less degree, and both grades are in demand for the second quarter and last half of this year. A number of northern Ohio foundries were unwilling to pay the price for the last half when foundry pig iron was around \$25, and they are now seeking to cover. The heavy buying has been by automobile companies and foundries that make automobile castings and Detroit has probably been the most active center. One Cleveland interest sold 90,000 tons of pig iron last week, and has already booked orders for about 40 per cent of its output for the first half of next year. The Ford Motor Company has purchased

40,000 tons of foundry iron for the first half of 1918. Foundries associated with another large central western automobile plant purchased 22,000 tons of foundry iron, and another foundry, making automobile castings, bought 10,000 tons, mostly malleable. The General Electric Company purchased 8000 to 10,000 tons for its Erie works. The Westinghouse Electric & Manufacturing Company has an inquiry out for a round tonnage foundry iron for its Cleveland plant for the last half, the amount required not being specified. Prices on foundry and malleable iron have been advanced \$1 a ton by two leading central western producers, who are now quoting \$39 for No. 2 foundry for prompt shipment from lake and valley furnaces, and \$35 for the first half. One Cleveland interest is still making the \$38 quotation for the last half of this year, but is not selling for next year, and one valley interest that occasionally sells a rather limited tonnage is also quoting foundry iron at \$38. Basic iron has advanced to \$35. A Cleveland consumer has taken 1000 tons at this price for the last half. Last week a southern Ohio consumer took 5000 tons of basic from a Youngstown producer at \$34, but it is claimed that no more basic is available at this price. Basic sales in the central West for shipment East during the past ten days are reported to have exceeded 100,000 tons, and these sales are said to have cleaned up about all the surplus basic in this territory, and caused a stiffening in the market. Bessemer iron has advanced to \$38. We note the sale of 3000 tons by a Cleveland interest at that price for the last half delivery. Southern iron has advanced \$2 a ton to \$32, Birmingham, for No. 2 for the last half, at which some sales have been made. Some tonnage has also been placed at this price for the first half of next year, but some producers are quoting \$30 to \$31 for that delivery. There is a fair demand for Southern iron for early shipment in the second quarter, and for early delivery producers generally are quoting \$35, so that there is a spread of \$5 in Southern iron prices, depending on delivery. We quote delivery to Cleveland as follows:

Bessemer	\$38.95
Basic	35.95
Northern No. 2 foundry	\$38.30 to 39.95
Southern No. 2 foundry	34.00 to 39.00
Gray forge	33.95
Ohio silvery, 8 per cent silicon	46.62

Coke.—The market is not so active, the buying movement in foundry coke having subsided. Prompt shipment prices are easier. We quote standard Connellsville foundry coke at \$7.50 to \$8.50 per net ton at oven for contracts for the last half and full year, and \$11 for prompt shipment. Virginia foundry coke is quoted at \$9 for contracts. Connellsville furnace coke for prompt shipment is quoted at \$8.

Finished Iron and Steel.—Lake shipyards have taken during the past few days 56 boats for the overseas shipping trade, for delivery during 1918. Most of these boats are the Welland Canal size, or around 260 ft. in length, but several are larger, and will be taken through the canal in two sections. Thirty-three of the boats will be built by the American Shipbuilding Company, 17 by the Great Lakes Engineering Works, and six by two other lake shipyards. These will require about 75,000 tons of plates and structural material. Lake shipyards will be able to take on many more boats for 1918 delivery, provided they are able to secure the steel. Mill shipments have increased materially as a result of the improved car situation. New demand is fairly heavy for any delivery that the mills can make. The demand for plates from shipyards and tank shops continues very heavy and prices are firmer for fairly early delivery. Plates are quoted at 5.50c. to 6.50c., Pittsburgh, and mills are having no trouble in making sales at 6c. For future delivery 5c. is the minimum quotation by several mills. Steel bars are quoted at 3.75c. and structural material at 4c. for delivery within the next three or four months. Orders for structural material, accompanied by specifications, are being placed for delivery in the first quarter of next year. Bids have been received for an addition to the store of the Bostwick-Braum Company, Toledo, requiring 600 tons. There is fair demand for small lots of light rails and standard sections, which are selling at

\$55 to \$60 for early shipment. Hard steel bars are fairly active and are quoted at 3c. to 3.25c. at mill. Iron bars are rather quiet with quotations unchanged at 3c. to 3.10c., Pittsburgh. There is a heavy demand for boiler tubes and consumers are willing to pay almost any price for delivery during the next six months. The demand for sheets is very active, and the mills are so well sold that very few are in the market at the present time. We quote sheets at 5.25c. to 5.65c., Ohio mill, for No. 28 galvanized; 5c. to 5.50c. for No. 10 blue annealed, and 4.75c. to 7.00c. for No. 28 galvanized. Warehouse prices are unchanged at 4.35c. for steel bars; 5.60c. for plates; 4.60c. for structural material; 5.50c. for hoops, and 5.50c. for blue annealed sheets.

Bolts, Nuts and Rivets.—There is considerable inquiry for bolt and nut contracts for the last half from implement, automobile, and other manufacturers, but bolt makers state that they will not open their books for last-half contracts until the end of April. At that time prices probably will be advanced for the last half. Specifications on existing contracts are fairly heavy. The rivet market is very firm at the recent advance in prices. New demand, particularly from the shipyards, is fairly heavy. We quote rivets at 4.75c., Pittsburgh, for structural rivets, and 4.85c. for boiler rivets. Bolt and nut discounts are as follows:

Common carriage bolts, $\frac{3}{8}$ x 6 in., smaller or shorter, rolled thread, 40 and 10; cut thread, 40 and 2 $\frac{1}{2}$; larger or longer, 30 and 5. Machine bolts with h.p. nuts, $\frac{3}{8}$ x 4 in., smaller or shorter, rolled thread, 50; cut thread, 40 and 10; larger or longer, 35 and 5. Lag bolts, cone point, 50. Square and hexagon, h.p. nuts, blank, \$2.50 off the list; tapped, \$2.30 off. C.p.c. and t. hexagon nuts, all sizes, blank, \$2.25 off; tapped, \$2 off. Cold pressed semi-finished hexagon nuts, 50, 10 and 5 off.

Old Material.—The market is very firm, and prices on many grades are higher, in spite of the fact that there is little activity. Heavy melting steel is \$2 a ton higher in Cleveland, and is quoted up to \$25 to \$26 for Youngstown and Canton delivery. The American Steel & Wire Company has purchased about 12,000 tons of scrap for Cleveland consumption, including 5000 to 7000 tons of heavy melting steel. A Cleveland mill has taken 1000 tons of busheling at \$19; and a sale of 500 tons of railroad wrought scrap is reported at \$30. Steel axles are somewhat easier, owing to the disappearance of the demand for export. Trading is mostly between dealers. Scrap has been moving the past few days faster than the mills wanted, and three Cleveland mills have cut off shipments, and a fourth is embargoed. We quote f.o.b. Cleveland as follows:

Per Gross Ton	
Steel rails	\$22.00 to \$23.00
Steel rails, rerolling	29.00 to 30.00
Steel rails under 3 ft.	28.00 to 29.00
Iron rails	29.00 to 30.00
Steel car axles	45.00 to 47.00
Heavy melting steel	24.50 to 25.00
Carwheels	21.50 to 22.00
Relaying rails, 50 lb. and over	37.00 to 38.00
Agricultural malleable	16.50 to 17.00
Railroad malleable	22.50 to 23.00
Light bundled sheet scrap	15.50 to 16.00

Per Net Ton	
Iron car axles	\$44.00 to \$45.00
Cast borings	10.75 to 11.00
Iron and steel turnings and drillings	10.00 to 10.25
No. 1 busheling	19.00 to 19.50
No. 1 railroad wrought	27.00 to 27.50
No. 1 cast	20.00 to 21.00
Railroad grate bars	14.75 to 15.25
Stove plate	14.25 to 14.50

Cincinnati

CINCINNATI, OHIO, March 28, 1917—(By Wire).

Pig Iron.—An Indiana manufacturer has put out a general inquiry for 1500 tons of 8 per cent silvery iron for August-December shipment. So far no quotations have been made, ability to make shipment being regarded as questionable. The lowest price obtaining this week on 8 per cent Ohio silvery is \$46, at furnace, for last-half shipment, with only a small tonnage available. The nominal quotation on Northern No. 2 foundry iron is around \$36, Ironton, for the last half, with but a few odd lots to draw from for filling new orders. The furnaces in that district are unable to

quote for the first half of this year. Malleable iron is probably a little easier to obtain than either foundry or basic. Nearly all Southern furnaces have withdrawn for the first half, and several are not quoting for the last half. The majority of sales made lately were on a basis of \$32 for the last half, but there is yet a small tonnage on the market for nearby shipment that was offered last week at \$30, Birmingham basis. Although contracting is very light, this iron will probably be out of the way before the end of the week. Orders for the first half of next year have been looked at \$32 to \$33, Birmingham, but both sellers and buyers are moving very cautiously and neither seem disposed to force the issue. Virginia furnaces are openly soliciting business at \$33, at furnace, for No. 2X for first-half shipment in 1918. Only a limited tonnage has been bought in this immediate territory. Based on freight rates of \$2.90 from Birmingham, and \$1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$33.40 to \$33.90
Southern coke, No. 2 f'dry and 2 soft.	32.90 to 33.40
Southern coke, No. 3 foundry	32.40 to 32.90
Southern coke, No. 4 foundry	31.90 to 32.40
Southern gray forge	28.90 to 29.40
Ohio silvery, 8 per cent silicon	45.26 to 46.26
Southern Ohio coke, No. 1	37.76
Southern Ohio coke, No. 2	37.26
Southern Ohio coke, No. 3	36.76
Southern Ohio malleable Bessemer	37.26
Basic, Northern	37.75
Lake Superior charcoal	37.20
Standard Southern carwheel	32.90

(By Mail)

Finished Iron and Steel.—A nearby mill has advanced prices on No. 28 galvanized sheets to 7.65c. and No. 28 black to 5.65c., f.o.b. Cincinnati or Newport, Ky. The nominal price of No. 10 blue annealed ranges from 5.15c. to 5.25c. Twisted bars for reinforcing concrete purposes are in much better demand. General warehouse business is improving. As a rule the warehouses are able to satisfy customers' needs promptly as their stocks are being gradually replenished at a more satisfactory rate. We quote store prices as follows: Wire nails, \$3.60 per keg, base; barb wire, 4.40c. to 4.45c.; steel bars, 4.15c.; twisted steel bars, 4.30c. base; rounds and squares, 2-in. and over, 4.45c.; structural shapes, 4.40c.; plates, $\frac{1}{4}$ -in. and heavier, 5.50c.; 3/16-in., 5.60c.; No. 8 gage, 5.65c.; No. 10 blue annealed sheets, 5.50c.; machine bolts, $\frac{3}{8}$ x 4-in. and smaller, 50 per cent discount; larger and longer, 30 and 10 per cent discount; hack saws, 10 per cent discount; set screws, 45 per cent discount and files 50 and 10 per cent discount.

Old Material.—Locomotive tires, railroad tank and sheet scrap and No. 1 railroad wrought have all taken on sharp advances. Business is better than in the previous week, although there is yet trouble in making shipments to some points in the East. The foundries are consuming more scrap than usual, partly because of the high cost of pig iron. The following are dealers' prices f.o.b. at yards, southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap	\$15.00 to \$15.50
Old iron rails	24.75 to 25.25
Relaying rails, 50 lb. and up	28.25 to 28.75
Rerolling steel rails	24.75 to 25.25
Heavy melting steel scrap	21.25 to 21.75
Steel rails for melting	21.25 to 21.75

Per Net Ton	
No. 1 railroad wrought	\$24.00 to \$25.00
Cast borings	6.50 to 7.00
Steel turnings	6.50 to 7.00
Railroad cast	16.25 to 17.25
No. 1 machinery cast	18.00 to 18.50
Burnt scrap	10.25 to 10.75
Iron axles	33.50 to 34.00
Locomotive tires (smooth inside)	30.00 to 31.00
Pipes and flues	13.75 to 14.25
Malleable cast	15.25 to 15.75
Railroad tank and sheet	14.00 to 15.00

Coke.—Spot prices on foundry coke are easing up a little. As low as \$11 at oven can be done on some brands, but the average price in all districts is around \$12 per net ton. Contract quotations run all the way from \$7.50 to \$9 at oven. Furnace coke is quoted at \$7 to \$8 per net ton at oven in all three fields. There is yet some foundry coke to be purchased for shipment this year, but contracting is light. The railroad situation has improved considerably, and the foundries are getting supplies at a more regular rate.

Birmingham

BIRMINGHAM, ALA., March 26, 1917.

Pig Iron.—The Birmingham iron market has practically advanced another \$2. On March 23 the leading interest and one other were quoting \$32, with some sales at that figure. Sales the preceding week were made at \$30 and \$31, continuing up to the date mentioned. Regular customers might still secure some iron at \$30, but the minimum for the general run of trade has advanced to \$32. Sales have been rather light and the inquiry has not been brisk. Special iron has sold as high as \$35. One maker has given a quotation of \$32.50 for 1918 on special iron. Some few 1918 bookings have been made around \$30, but, as a rule, makers are steering clear of that delivery. Carload lots have brought anywhere from \$30 to \$33. In the present situation the price paid, with \$30 as the minimum, depends upon the character of customer, quantity, etc. Shipments are so impeded that foundries find it difficult to keep going steadily. Indeed, shutdowns have occurred here and there. The output of basic will be increased in April by the blowing in of the Silver Run furnace of the Matthews Iron Company at Rome, Ga., and of the Eagle furnace near Alabama City, which the Gulf States Steel Company has leased. Indications point to a continued increase in the output of basic and a growing scarcity of foundry iron. The Alabama Company is relining its idle stack at Ironaton, which produces special high-silicon iron, selling at a premium. In no direction is there a prospect of anything but decrease in the output of foundry iron. Makers and brokers are inclined to believe that Southern iron may reach \$40 before the rise is checked. The principal worry now is to get the metal to consumers, who unite in pressing their pleas for prompt shipment. Agents of Northern consumers are intermittently in the district to secure metal, but find it difficult, owing to the superior claims of regular customers. We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 1 foundry and soft.....	\$30.50 to \$32.50
No. 2 foundry and soft.....	30.00 to 32.00
No. 3 foundry.....	29.50 to 31.50
No. 4 foundry.....	29.25 to 31.25
Gray forge.....	29.00 to 31.00
Basic.....	30.00 to 32.00
Charcoal.....	34.00 to 36.00

Cast-Iron Pipe.—Makers of water and gas pipe have advanced another \$1 per ton, and quotations f.o.b. Birmingham district pipe shop yards, are now as follows: 4-in., \$43; 6-in. and upward, \$40, with \$1 added for gas pipe and extra lengths. Some orders come in despite the high prices, but the majority of specifications are cut as much as possible to actual and pressing needs. Flange pipe for oil concerns is more active, the Birmingham shops being now busy on specifications for the Standard Oil of Louisiana, the Gulf Refining Company of Port Arthur and the Beaumont field.

Coal and Coke.—Standard beehive spot coke remains at a minimum of \$12.50 per net ton at oven, and is very scarce at that. Forward contracts for quantities have been made at \$9.50. Furnace coke sells at \$5 minimum, with little offering. The Gulf States Steel Company expects to start operations at its Alabama City Koppers by-product ovens within a month. Steam coal remains around \$3 for spot, with blacksmithing coal selling at \$4. Contracts are on the basis of \$2.50 and higher. There is extraordinary activity in the Walker County and other coal fields in an effort to rush new collieries into operation while the harvest lasts.

Old Material.—Dealers are having a good business in heavy melting steel and cast scrap. Owing to the high price of pig iron, there is an increasing consumption of the latter in mills and foundries. We quote, per gross ton, f.o.b. Birmingham district yards, as follows:

Old steel axles.....	\$34.00 to \$36.00
Old steel rails.....	19.00 to 19.50
No. 1 wrought.....	19.00 to 20.00
Heavy melting steel.....	16.50 to 17.00
No. 1 machinery.....	16.75 to 17.25
Carwheels.....	17.00 to 18.00
Tram carwheels.....	14.50 to 15.00
Stove plate and light.....	11.00 to 11.50
Shop turnings and borings.....	8.00 to 8.50

St. Louis

ST. LOUIS, MO., March 26, 1917.

Pig Iron.—Need for pig iron is causing consumers to spread their inquiries among a larger number of dealers than is usual with them, in the hope that somewhere along the line they may be able to get the material they want, but they are getting very little consolation, as furnace representatives are unable to accord them any 1917 deliveries and are unwilling to contract to any extent for 1918 delivery, though some contracts for the first half of next year have been reported. These, however, have been for relatively small quantities in foundry grades, the largest for the past week having been for 600 tons of No. 2 Southern, which went at about \$32 Birmingham. Another sale of 200 tons of the same grade and delivery brought the same price. A considerable number of sales of small lots ranging down from 200 tons were reported, mostly for last half delivery and for old customers whom the furnaces desired to take care of were reported. Consumers are crowding furnaces for deliveries.

Coke.—An easier situation was reported in coke for the week, with prompt shipment coke obtainable on a basis of \$11 to \$12 Connellsville, while deferred shipments ranged from \$8.25 to \$8.75 Connellsville, both quotations being for best selected 72-hour grades.

Finished Iron and Steel.—In finished products, specifications on contracts are getting stronger in their pressure upon the mills, but new contracts are not being made to any great extent. No standard section steel rail business has appeared, but light rails are much in demand from the coal companies. Track fastenings are in good request, with light spikes at 3.70c. base and heavy spikes at 3.80c. base. Angle bars are held at 2.75c. Movement out of warehouse continues very heavy, with the advanced prices readily paid by consumers who are most concerned with delivery. We quote for material out of stock as follows: Soft steel bars, 4.05c.; iron bars, 4c.; structural material, 4.30c.; tank plates, 5.55c.; No. 10 blue annealed sheets, 5.55c.; No. 28 black sheets cold rolled one pass, 5.75c.; No. 28 galvanized sheets, black sheet gage, 8c.

Old Material.—Prices for scrap are decidedly stiffer in tone, but quotations are essentially nominal, as the prices are entirely dependent upon the situation of the buyer and the seller at the moment of the transaction. The call is for all grades and classes of material for foundries, steel mills and rolling mills uses, but the demand is still largely speculative or due to dealers' shortages. The only list out during the week was one for about 2000 tons from the Burlington. We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails.....	\$28.00 to \$28.50
Old steel rails, rerolling.....	29.50 to 30.00
Old steel rails, less than 3 ft.....	26.50 to 27.00
Relaying rails, standard section, subject to inspection.....	36.00 to 38.00
Old carwheels.....	21.00 to 21.50
No. 1 railroad heavy melting steel scrap.....	24.00 to 24.50
Heavy shoveling steel.....	19.00 to 19.50
Ordinary shoveling steel.....	18.50 to 19.00
Frogs, switches and guards cut apart.....	24.50 to 25.00
Ordinary bundled sheet scrap.....	15.00 to 15.50

Per Net Ton	
Iron angle bars.....	\$26.50 to \$27.00
Steel angle bars.....	22.50 to 23.00
Iron car axles.....	35.00 to 35.50
Steel car axles.....	34.50 to 35.00
Wrought arch bars and transoms.....	28.00 to 28.50
No. 1 railroad wrought.....	25.50 to 26.00
No. 2 railroad wrought.....	24.50 to 25.00
Railroad springs.....	24.00 to 24.50
Steel couplers and knuckles.....	25.50 to 26.00
Locomotive tires 42 in. and over, smooth inside.....	33.50 to 34.00
No. 1 dealers' forge.....	18.50 to 19.00
Cast iron borings.....	10.00 to 10.50
No. 1 busheling.....	18.00 to 18.50
No. 1 boilers, cut to sheets and rings.....	14.50 to 15.00
No. 1 railroad cast scrap.....	16.00 to 16.50
Stove plate and light cast scrap.....	11.50 to 12.00
Railroad malleable.....	17.50 to 18.00
Agricultural malleable.....	16.50 to 17.00
Pipes and flues.....	15.50 to 16.00
Heavy railroad sheet and tank scrap.....	14.50 to 15.00
Railroad grate bars.....	13.00 to 13.50
Machine-shop turnings.....	10.50 to 11.00
Heavy axle and tire turnings.....	13.00 to 13.50

New York

NEW YORK, March 28, 1917.

Pig Iron.—Manufacturers of railroad and electrical equipment, of machinery and steam and gas fittings, and jobbing and special foundries and steel plants have placed contracts in the last week for about 30,000 tons of foundry and basic iron for shipment over the last half of this year and the first half of 1918. One or two large consumers are still negotiating for round tonnages and there are a number of small consumers who have not fully covered their requirements for this year. The Northern markets are in a more settled condition, but quotations on Southern iron show a wide divergence. A large Connecticut founder has closed for 5000 tons of foundry grades with New York State, Pennsylvania and Virginia furnaces for first half of 1918 shipments. A New Jersey manufacturer of steam and gas fittings has bought 1500 tons; a machinery manufacturer 2000 tons and another founder 1500 tons of Northern iron for last half of this year and the first half of next. A pump manufacturer has completed contracts for special coke and charcoal foundry iron and for low-phosphorus metal for next year's needs amounting to about 3000 to 4000 tons. An electrical equipment manufacturer wants 500 tons of high manganese iron for the five months beginning November. A steel manufacturer in New Jersey has closed for 5000 tons of basic with a Pennsylvania interest, shipments beginning in June. Another eastern Pennsylvania furnace has closed for several thousand tons of low-phosphorus iron at prices ranging from \$70 to \$75 at furnace. A recent sale of 12,000 tons of standard Bessemer at \$39 tidewater for prompt shipment has come to the surface. Most of the sales of foundry iron made by producers in the Lehigh and Schuylkill Valleys have been at \$39 to \$40, furnace, for No. 2 foundry. Central Pennsylvania furnaces have sold from \$38 to \$41 per ton for this year's delivery and at \$36 for next year's shipment. Buffalo furnaces have sold at \$38 to \$40 per ton for this year's delivery and at \$35 to \$36 for the first half of 1918. One Buffalo producer, however, who quoted \$40 for No. 2, lost the business in competition with Virginia interests by \$6 per ton, indicating sales of Virginia as low as \$34 at furnace for July shipment. On the other hand Virginia furnaces have sold at \$36 for shipment over the last half of this year and at \$32 to \$33 over the first half of next year. Unsettled conditions are still evident in the South where sales of No. 2 are reported all the way from \$28 to \$32 at the furnace. Some No. 3 iron has sold at \$27.50 for this year's delivery. We quote at tidewater for early delivery: No. 1 foundry, \$39.20 to \$41.20; No. 2 X, \$38.70 to \$40.70; No. 2 plain, \$38.20 to \$39.20; Southern iron at tidewater, \$33.75 to \$34.75 for No. 1 and \$33.25 to \$34.25 for No. 2 foundry and No. 2 soft.

Ferroalloys.—The total inquiries for ferromanganese before the market amount to no more than 1000 tons and few sales have been made. The alloy is regarded as generally scarce, especially for delivery before July 1, there being no British material available and but little domestic. For early delivery not less than \$300, delivered, is asked for the domestic alloy. The quotation for the last half is \$250 to \$300, delivered. Within the last two weeks some sales have been made of an alloy averaging 30 to 40 per cent manganese for which \$3.50 per unit has been obtained. The spiegeleisen market is quiet, about \$75 being asked for early delivery and about \$60 to \$65, furnace, for contract material. The market for 50 per cent ferrosilicon is still strong, but is regarded as a little easier. The last contract quotation was \$100 and as high as \$250 has been paid for early delivery.

Structural Material.—There is evidence that manufacturing plants are still urgently in need of steel to make extensions and improvements, but the higher prices prevailing for fabricated and plain shapes have checked apartment house and loft building activity in the New York metropolitan district. Inquiries, however, continue numerous. Among the largest contracts closed in the last few days are 2000 tons for a gas producer building

at Monessen, Pa., for the Pittsburgh Steel Company, awarded to the American Bridge Company; 1700 to 2500 tons for transmission towers at Charlotte, N. C., for the Southern Power Company awarded to Milliken Brothers, Inc.; 2700 tons for the Fox Building at Hartford, awarded to Levering & Garrigues Company; 3000 tons for a power house at Wheeling for the American Gas & Electric Company, awarded to the Riverside Bridge Company; 1000 tons for pipe bands for Utah, placed by the Phoenix Construction Company, Utah; 1500 tons for a power house and paper mill at Twin Falls and Mohawk Falls, Ontario, placed with the Dominion Bridge Company, and 450 tons for an office building at 63 and 65 Maiden Lane, placed with the Levering & Garrigues Company. It is also understood that the Crucible Steel Company is closing contracts for about 8000 tons of steel for plant extensions with the American Bridge Company. Railroads have bought several thousand tons of bridge work, including 1000 tons for 12 bridges for the Pennsylvania Railroad, 650 tons additional for the Chesapeake & Ohio, and 300 tons for locomotive repair shops at Salamanca for the Buffalo, Rochester & Pittsburgh, placed through Westinghouse, Church, Kerr & Co. The New York Central has taken bids on 1500 tons for the elimination of grade crossings at Buffalo, Rochester and Clyde. The Boston Elevated has awarded about 400 tons for the Charleston bridge, and is still taking orders for 850 tons additional structural work. Among work pending is a sugar mill in Cuba requiring 1500 to 2000 tons of steel; several transmission towers in various sections of the country requiring several thousand tons of steel; a factory building for Runkel Brothers, Inc., New York, calling for 1500 tons of steel; an office building at 35 and 39 Broadway, 700 tons; and a subway-elevated connection at 149th Street, 900 tons. There are also numerous inquiries, running from 100 to 200 tons each, for manufacturing plant improvements, telephone exchanges, commercial buildings and high schools. We quote mill shipments of shapes in three to six months at 3.919c. to 4.169c., New York. For warehouse shipments we quote 4.50c., New York.

Billets and Bars.—Negotiations are understood to have been virtually closed on a large tonnage of billets for deliveries beginning in the near future and extending over the rest of the year, and even longer. Bids have been submitted on a large tonnage of shell steel for export and on several small tonnages for domestic shipment. Structural bars are quiet. We quote mill shipments of bar iron at 3.669c., and steel bars at 3.919c., New York. Out of warehouse, iron bars are 4c., and steel bars 4.35c., New York.

Steel Plates.—An Atlantic coast shipyard has secured 20,000 tons of hull plates from a Pittsburgh mill, shipment to be made over the first quarter of 1918. Contracts for about 18,000 tons, to be divided among several mills, are expected to be closed in the next few days. Until the United States Government's needs have been satisfied, scant attention will be paid to export business. The last sale of foreign shipment is understood to have been 10,000 tons for Japan. One inquiry is for steel for seven boats for Argentina. Several southern and eastern railroads have bought firebox plate on the basis of 6½c., Pittsburgh, for tank plate. Formal awards for building submarine chasers will be announced on Saturday, but it is understood that some prospective builders are already placing contracts for material; the only plates needed will be used in the construction of bulkheads opposite the engines. Universal plates for shipment within a few months are commonly quoted at 6c., base, Pittsburgh, tank plates at 6½c., and ship plates at 7c., but two eastern Pennsylvania mills are quoting 7½c. for ship plates, and have named 8c. per pound on some foreign business not specially desired. We quote best deliveries on universal plates at 5.669c. to 6.169c., New York; ordinary tank plates at 6.169c. to 6.669c., and ship plates at 7.169c. to 7.669c., but indefinite delivery plates at 4.669c., New York. Out of store we quote 5½c., New York.

Cast-Iron Pipe.—Prices have advanced considerably more than forecasted in this report last week. The ink had hardly been dry when an advance of \$2 per ton was made and this was followed a few days after by an advance of \$3 more. Carload lots of 6-in., class B and

heavier, are now quoted at \$47.50 per net ton, tide-water, with class A and gas pipe taking the usual extra of \$1 per ton. The city of Hartford, Conn., which opened bids March 20 on 7000 tons, has awarded the United States Cast Iron Pipe & Foundry Company and the Warren Foundry & Machine Company each 3500 tons. The pipe is mainly 34 to 42½ in. in diameter, and the division between the two companies was made for the purpose of getting more rapid deliveries than if the whole contract had been given to one. The city of Tarrytown opens bids to-day on 230 tons of 6, 8 and 10 in. Bids were opened at Boston March 26 on 2600 tons of 4 to 40 in., and they are now being held under advisement. The bids on the 4-in. ran from \$48.50 to \$50.75, on the 6-in. from \$45.50 to \$47.75 and on the 40-in. from \$46.50 to \$50 per net ton, delivered. Quite a number of municipalities in New England are now coming in the market for their spring requirements, but most of the quantities called for are not large. Private buying is active.

Old Material.—The demand is strong for all kinds of scrap, and prices on some commodities are higher. Consumers in the vicinity of Pittsburgh are drawing on this market again, paying considerably more than is being offered by steel companies in eastern Pennsylvania. This appears to make it expedient, at least temporarily, to quote two sets of prices on steel scrap. Brokers quote buying prices as follows to local dealers and producers, per gross ton, New York:

Heavy melting steel scrap (for shipment West)	\$23.50 to \$24.00
Heavy melting steel scrap (for shipment eastern Pennsylvania)	21.75 to 22.00
Relaying rails	40.00 to 41.00
Rerolling rails	30.00 to 31.00
Iron car axles	45.00 to 46.00
Steel car axles	45.00 to 46.00
No. 1 railroad wrought	31.00 to 32.00
Wrought-iron track scrap	26.00 to 27.00
No. 1 yard wrought, long	26.00 to 27.00
Light iron	8.00 to 9.00
Cast borings (clean)	13.50 to 14.00
Machine-shop turnings	13.00 to 13.50
Mixed borings and turnings	13.00 to 13.50
Wrought-iron pipe (not galvanized or enameled)	19.00 to 19.50

Foundries continue to be free buyers of cast scrap. Prices given below are those paid by consumers purchasing in good quantities, but foundries in New York City and Brooklyn are securing small lots of Nos. 1 and 2 cast from nearby dealers at considerably less than these quotations:

No. 1 cast	\$24.00 to \$25.00
No. 2 cast	22.00 to 23.00
Stove plate	16.00 to 17.00
Locomotive grate bars	16.00 to 17.00
Old carwheels	23.50 to 24.00
Malleable cast (railroad)	22.50 to 23.00

British Steel Market

Pig-Iron Output Increasing—American Steel Nominal—Ferromanganese Sellers Scarce

LONDON, ENGLAND, March 28, 1917.—(By Cable.)

There is a good demand for Cleveland pig iron and the output has somewhat increased. Tin plates are slow but firm. American semi-finished steel is nominal. Ferromanganese is firm and sellers are scarce. We quote as follows:

Tin plates coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 27s. against 26s. 6d. last week.
Ferromanganese, £37 nominal.
Ferrosilicon, 50 per cent, c.i.f. £35 upward.

The Youngstown Sheet & Tube Company has presented 125 gold watches to heads of departments of its plants who made records during its safety week, held in October, 1916. The company is fast completing some of its new construction. Its No. 10 open-hearth furnace will make steel early in April, and Nos. 11 and 12 are expected to be finished in May. The company will then have a total of 12 100-ton open-hearth furnaces.

The Automatic Sprinkler Company of America, Youngstown, Ohio, announces that extensive additions to its manufacturing facilities will be made shortly.

Iron and Industrial Stocks

NEW YORK, March 28, 1917.

The stock market was sharply stimulated for a portion of the past week by the announcement of the application of railroad companies for permission to advance their freight rates, coupled with the general belief that the Interstate Commerce Commission will this time be found in sympathy with such a proposition. The advance maintained its strength until Saturday, but on Monday and Tuesday some recession occurred, except in the railroad equipment companies, which continued to show advances. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com. 28¾-30¼	Int. Har. of N. J., com. 116-120
Allis-Chal., pref. 85¾-86½	Int. Har. of N. J., pref. 117¼-118
Am. British, com. 10	Int. Har. Corp., com. 80-81
Am. Can., com. 47¼-49¾	Int. Har. Corp., pref. 111
Am. Can., pref. 106½	La Belle Iron, com. 86-87½
Am. Car & Fdry., com. 68½-71¼	Lacka. Steel, com. 85¼-88¾
Am. Car & Fdry., pref. 116	Lake Sup. Corp., com. 20¾-23¼
Am. Loco., com. 71½-75¾	Lima Loco., com. 57-63¼
Am. Loco., pref. 105-105½	Lukens, com. 41-42¼
Am. Rad., com. 295-300	Lukens, 1st pref. 100-101½
Am. Ship, com. 72-78	Midvale Steel, com. 59¾-62¼
Am. Ship, pref. 95	Nat-Acme, com. 34-35
Am. Steel Fdries. 62¾-65¾	Nat. En. & Stm., com. 34¼-36
Bald. Loco., com. 56¼-63½	Nat. En. & Stm., pref. 98½-99
Bald. Loco., pref. 101-101½	N. Y. Air Brake, 152-156
Beth. Steel, com. 141¼-149¾	Pitts. Steel, pref. 100¾-101
Beth. Steel, class B 133½-143¾	Pressed Stl., com. 78¼-82¾
Beth. Steel, pref. 120-120½	Pressed Stl., pref. 104-105
Cambria Steel, 115-130	Ry. Steel Spring, com. 52-55¾
Carbon Steel, 1st pref. 97	Republic, com. 82-86¾
Case (J. I.), pref. 83½	Republic, pref. 102-103
Central Fdry., com. 22	Sloss, com. 70-74½
Central Fdry., pref. 37-40½	Sloss, pref. 97
Charcoal Iron, com. 7¾-8	Superior Steel, 31-31¾
Chic. Pneu. Tool, 68	Transue-Williams 45¾-46½
Colo. Fuel, com. 51-54½	Un. Alloy Steel, 45¾-46¾
Colo. Fuel, 112	U. S. Pipe, com. 20¾-22¾
Cruc. Steel, com. 65¾-73¼	U. S. Pipe, pref. 58½-60
Cruc. Steel, pref. 111-111½	U. S. Steel, com. 114½-118
Deere & Co., pref. 98½	U. S. Steel, pref. 118-118¾
Driggs-Seabury, 61-68	Va. I. C. & Coke 65-71½
Gen. Electric, 167-169¾	Warwick, 9¼
Gt. No. Ore Cert. 34¼-37¾	Westing. Elec. 51¾-54¼
Gulf States Steel, 123-131	
Harb-Walk. Refrac., pref. 107	

Dividends

The America-La France Fire Engine Company, regular quarterly, 1½ per cent on the preferred, payable April 2.

The American Laundry Machinery Company, regular quarterly, 1½ per cent on the preferred, payable April 14, and 1 per cent on the common, payable May 15.

The American Screw Company, regular quarterly, 1½ per cent and extra 1 per cent, payable March 31.

The American Seeding Machine Company, regular quarterly, 1 per cent on the common and 1 per cent on the preferred, payable April 15.

The Atlantic Steel Company, regular quarterly, 1½ per cent and extra 1 per cent on the common, payable April 2.

The Billings & Spencer Company, regular quarterly, 2 per cent and extra 3 per cent, payable April 2.

The Canadian Crocker-Wheeler Company, regular quarterly, 1½ per cent on the preferred, payable March 31.

The Carbon Steel Company, 4 per cent on the first preferred, payable March 26.

The Central Foundry Company, initial quarterly payment, 2 per cent on the first preferred, payable April 15.

The Charcoal Iron Company, initial quarterly, 1½ per cent on the common, payable April 15.

The Dodge Mfg. Company, quarterly, 4 per cent on the common, payable on demand, and special 1½ per cent, payable April 1.

The Dominion Steel Corporation, regular quarterly, 1 per cent on the common, the first in three years, payable April 16, and 1½ per cent on the preferred, payable May 1.

Manning, Maxwell & Moore, Inc., regular quarterly, 1½ per cent, payable March 31.

The Pittsburgh Coal Company, regular quarterly, 1½ per cent on the preferred, payable April 25.

The Pittsburgh Steel Company, regular quarterly, 2 per cent on the common, payable April 2.

The Scovill Mfg. Company, regular quarterly, 2 per cent and extra 10 per cent, payable April 1.

The Steel Company of Canada, regular quarterly, 1 per cent and bonus ½ per cent on the common, and regular quarterly 1½ per cent on the preferred, payable May 1.

The Sullivan Machinery Company, regular quarterly, \$1.50 and extra \$1 per share, payable April 15.

The Trussed Concrete Steel Company, regular quarterly, 4 per cent, payable April 6.

The Wheeling Mold & Foundry Company, regular quarterly, 1 per cent and extra 1 per cent, payable May 2.

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c. Denver, pipe, 76.1c., minimum carload, 46,000 lb.; structural steel and steel bars, 83.6c., minimum carload, 36,000 lb. Pacific coast (by rail only), pipe, 65c.; structural steel and steel bars, 75c., minimum carload, 50,000 lb.; structural steel and steel bars, 80c., minimum carload, 40,000 lb. No freight rates are being published via the Panama Canal, as the boats are being used in transatlantic trade.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees 3 in. and over, 3.60c. to 3.75c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .30
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Plates.—Tank plates, ¼ in. thick, 6 in. up to 100 in. wide, 450c., to 5c., base, net cash, 30 days, or ½ of 1 per cent discount in 10 days, carload lots. Extras are:

	Quality Extras	Cents per lb.
Tank steel	Base	
Pressing steel (not flange steel for boilers)		.10
Boiler and flange steel plates		.15
"A. B. M. A." and ordinary firebox steel plates		.20
Still bottom steel		.30
Locomotive firebox steel		.50
Marine steel, special extras and prices on application.		

	Gage Extras	Cents per lb.
Rectangular, ¼ in. thick, over 6 in. wide to 100 in. wide	Base	
Lighter than ¼ in., to 3/16 in., up to 72 in. wide		.10
Lighter than ¼ in., including 3/16 in., over 72 in. to 84 in.		.20
Lighter than ¼ in., including 3/16 in., over 84 in. to 96 in.		.30
Lighter than ¼ in., including 3/16 in., over 96 in. to 100 in.		.40
Lighter than ¼ in., including 3/16 in., over 100 in. to 102 in.		.45
Lighter than 3/16 in., including No. 8, up to 72 in. wide		.15
Lighter than 3/16 in., including No. 8, over 72 in. to 84 in.		.25
Lighter than 3/16 in., including No. 8, over 84 in. to 96 in.		.35
Lighter than No. 8, including No. 10, up to 60 in. wide		.30
Lighter than No. 8, including No. 10, over 60 in. to 61 in.		.35
Up to 72 in. and not less than 10.2 lb. per sq. ft. will be considered ¼ in.		
Over 72 in. must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft. to take base price.		
Over 72 in. wide, ordered less than 11 lb. per sq. ft., down to weight of 3/16 in., take price of 3/16 in.		
Over 72 in., ordered weight 3/16 in., take No. 8 price.		
Over 72 in., ordered weight No. 8, take No. 10 price.		

	Width Extras	Cents per lb.
Over 100 in. to 110 in. inclusive		.05
Over 110 in. to 115 in. inclusive		.10
Over 115 in. to 120 in. inclusive		.15
Over 120 in. to 125 in. inclusive		.25
Over 125 in. to 130 in. inclusive		.50
Over 130 in.		1.00

	Length Extras	Cents per lb.
Universal plates 80 ft. long up to 90 ft. long		.05
Universal plates 90 ft. long up to 100 ft. long		.10
Universal plates 100 ft. long up to 110 ft. long		.20

	Cutting Extras	Cents per lb.
No charge for rectangular plates to lengths 3 ft. and over.		
Lengths under 3 ft. to 2 ft. inclusive		.25
Lengths under 2 ft. to 1 ft. inclusive		.50
Lengths under 1 ft.		1.55
Circles 3 ft. in diameter to 100 in.		.30
Circles over 100 to 110 in. (width extra)		.35
Circles over 110 to 115 in. (width extra)		.40
Circles over 115 to 120 in. (width extra)		.45
Circles over 120 to 125 in. (width extra)		.55
Circles over 125 to 130 in. (width extra)		.80
Circles over 130 in. (width extra)		1.30
Circles under 3 ft., to 2 ft. inclusive		.55
Circles under 2 ft., to 1 ft. inclusive		.85
Circles under 1 ft.		1.85
Half circles take circle extras.		
Sketches not over four straight cuts, inc. straight taper		.10
Sketches having more than four straight cuts		.20
Plates sheared to a radius take complete circle extras.		

*Including extra for width.

Wire Rods.—Including chain rods, \$85.

Wire Products.—Prices to jobbers, effective March 5: Fence wire Nos. 6 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, \$3.15; galvanized, \$3.85. Galvanized barb wire and

staples, \$4.05; painted, \$3.35. Wire nails, \$3.20. Galvanized nails, 1 in. and longer, \$2.20 advance over base price; shorter than 1 in., \$2.70 advance over base price. Cement-coated nails, \$3.10. Woven wire fencing, 51 per cent off list for carloads, 50 off for 1000-rod lots, 49 off for less than 1000-rod lots.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from March 5, 1917, all full weight:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1, 1½ and 2	53	26½	1, 1½ and 2	42	15
2½ to 3	57	42½	2½ to 3	43	16
3 to 4	60	46½	3 to 4	47	29
			4 to 5	50	36
Butt Weld			Lap Weld		
2	53	40½	1½	36	21
2½ to 6	56	43½	1½	42	34
7 to 12	53	39½	2	43	29
13 and 14	43½	..	2½ to 4	45	32
15	41	..	4½ to 6	45	32
			7 to 12	44	31
Reamed and Drifted			Butt Weld, extra strong, plain ends		
1 to 3, butt	58	44½	¾ to 1½, butt	45	28
2, lap	51	38½	1½, lap	31	15
2½ to 6, lap	54	41½	1½, lap	37	22
			2, lap	38	23
			2½ to 4, lap	41	26
Lap Weld, extra strong, plain ends			Standard Charcoal Iron		
1, 1½ and 2	49	31½	1½ in.	23	
2½ to 3	54	41½	1½ and 2 in.	35	
3 to 4	58	45½	2½ in.	32	
4 to 5	59	46½	2½ and 3 in.	38	
			3 and 3½ in.	43	
2	51	39½	3½ to 4½ in.	44	
2½ to 4	54	42½	5 and 6 in.	37	
4½ to 6	53	41½	7 to 13 in.	34	
7 to 8	49	35½			
9 to 12	46	30½			

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized, but in some sections of the country discounts on less than carloads are three (3) points less (higher price) than the carload discount on both black and galvanized steel pipe. On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are four (4) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are five (5) points lower (higher price).

Boiler Tubes.—Discounts on less than carloads freight to be added, effective from Nov. 1, 1916, except 3 to 4½ in. steel from Nov. 20, are as follows:

Lap Welded Steel		Standard Charcoal Iron	
1½ in.	31	1½ in.	23
1½ and 2 in.	43	1½ and 2 in.	35
2½ in.	40	2½ in.	32
2½ and 3 in.	46	2½ and 3 in.	38
3 and 3½ in.	46	3 and 3½ in.	43
3½ to 4½ in.	46	3½ to 4½ in.	44
5 and 6 in.	45	5 and 6 in.	37
7 to 13 in.	42	7 to 13 in.	34

Locomotive and steamship special charcoal grades bring higher prices.

1½ in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

Sheets.—Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as follows, 30 days net, or 2 per cent discount in 10 days:

	Blue Annealed Sheets	Cents per lb.
Nos. 3 to 8	5.00 to 5.25	
Nos. 9 to 12	4.75 to 5.00	
Nos. 13 to 16	4.50 to 4.75	
No. 17 and lighter gages are based on \$4.75 per 100 lb. for No. 28 Bessemer black sheets.		
Box Annealed Sheets, Cold Rolled		
Nos. 17 to 21	4.80 to 5.30	
Nos. 22 and 24	4.85 to 5.35	
Nos. 25 and 26	4.90 to 5.40	
No. 27	4.95 to 5.45	
No. 28	5.00 to 5.50	
No. 29	5.05 to 5.55	
No. 30	5.15 to 5.65	

Galvanized Sheets of Black Sheet Gage		
Nos. 10 and 11	6.00 to 6.25	
Nos. 12 to 14	6.10 to 6.35	
Nos. 15 and 16	6.35 to 6.60	
Nos. 17 to 21	6.40 to 6.65	
Nos. 22 and 24	6.55 to 6.80	
Nos. 25 and 26	6.70 to 6.95	
No. 27	6.75 to 7.00	
No. 28	7.00 to 7.25	
No. 29	7.15 to 7.40	
No. 30	7.30 to 7.55	

Tin-Mill Black Plate		
Nos. 15 and 16	4.55 to 4.80	
Nos. 17 to 21	4.60 to 4.85	
Nos. 22 to 24	4.65 to 4.90	
Nos. 25 to 27	4.70 to 4.95	
No. 28	4.75 to 5.00	
No. 29	4.80 to 5.05	
No. 30	4.85 to 5.10	
Nos. 30½ and 31	4.85 to 5.10	

Metal Markets

The Week's Prices

		Cents Per Pound for Early Delivery					
		Copper, New York	Tin, New York	Lead, New York		Spelter, New York	
		Electro-lytic		New	St.	New	St.
Mar.	Lake						
21	36.00	36.00	55.25	9.50	9.35	10.62½	10.37½
22	36.00	36.00	55.50	9.50	9.35	10.62½	10.37½
23	36.00	36.00	56.12½	9.40	9.25	10.75	10.50
24	35.75	35.75		9.40	9.25	10.75	10.50
25	35.50	35.50	56.50	9.40	9.25	10.75	10.50
26	35.50	35.50	55.87½	9.40	9.25	10.75	10.50

NEW YORK, March 28, 1917.

Practically all the metals are dull, awaiting the outcome of international events. Copper is easier and a little lower. Tin is still strong. Lead is steady, but with a tendency to ease off. Spelter is stagnant but firm. Antimony is scarce and higher, but nominal.

New York

Copper.—Business in general is slow and interest is lacking. Very little new business is reported. Outside of the recent sale to the Government the market is stale. Both Lake and electrolytic were quoted yesterday at about 35.50c. for early delivery, New York. The easier tendency is due to larger offerings of electrolytic for second-quarter delivery. Metal for second quarter is quoted at 34c. to 35c., with third quarter at 30.50c. to 31.50c. The London quotation yesterday for spot electrolytic is unchanged at £151.

Tin.—The market generally has been dull and quiet, although spot metal has remained strong. The total sales of tin for the week have been about 400 tons, most of it being sold March 21 to a Western consumer. A large part of this was off grade. Yesterday more interest was manifested, and there was considerable inquiry, but little business resulted. Anxiety as to the Philadelphian was relieved by the arrival of this vessel yesterday with over 800 tons of tin. The Eurybates also reached port with 1000 tons. These arrivals have caused the spot market to ease off and to render the general situation more comfortable. The London market continues to advance, the quotation for spot Straits tin yesterday having been £218 5s., an advance of nearly £4 over last week. The arrivals for the week have been 3580 tons, and the quantity afloat is 2436 tons.

Lead.—The well-sold-up condition of producers explains the steadiness of the lead market. It is not necessary for them to seek orders. If they were compelled to, without doubt a slump would be in evidence before this. A prominent topic of conversation has been the sale of copper to the Government, and this has led to the discussion as to whether lead producers will be called upon to follow suit. It is generally believed that they will, and that similar arrangements will be made by them to meet the Government's requirements. In general, conditions are unchanged and dull. Arrivals from the West are ample to meet the needs of buyers. Prompt and March metal is quoted at 9.50c., with 9.25c. asked for April, and 9c. for second quarter. The price of the leading interest is unchanged at 9c. New York.

Spelter.—The market continues devoid of interest, and is stagnant. No real weakness, however, has appeared, and the little business that has been done has been at firm prices. The brass interests still refrain from purchases, some of them not operating to full capacity. The quotation yesterday was nominally 10 50c. to 10.62½c., St. Louis, for prompt March shipment, or 10.75c. New York. April metal was quoted at 10.25c., with second-quarter delivery at about 10c., St. Louis. The ore situation remains unchanged. Inquiry yesterday from sheet galvanizers for second-quarter delivery is reported.

Antimony.—Spot metal is scarce, and is nominally quoted at 34c. to 35c. for Chinese and Japanese grades. One dealer reports having sold a spot lot Tuesday at 38.50c. Arrivals from the West are still delayed.

Aluminum.—Spot metal is reported as a little more difficult to get, but the general situation is unchanged. No. 1 virgin aluminum, 98 to 99 per cent pure, is quoted at 59c. to 60c. for early delivery.

Old Metals.—The market is less active. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	32.50 to 33.00
Copper, heavy and wire	32.00 to 32.50
Copper, light and bottoms	27.00 to 27.50
Brass, heavy	20.00 to 20.50
Brass, light	15.75 to 16.00
Heavy machine composition	26.25 to 26.75
No. 1 yellow rod brass turnings	20.50 to 21.00
No. 1 red brass or composition turnings	23.00 to 24.00
Lead, heavy	8.75
Lead, tea	8.375
Zinc	9.00

Chicago

March 27.—Uncertainty as to the future is causing hesitancy in buying, which accounts for lower quotations for copper, but tin and antimony are higher. Deliveries continue slow. We quote: Casting copper, 33c. to 33.50c.; lake and electrolytic, 35.50c.; tin, carloads, 57c., and small lots, 59c.; lead, 9.50c.; spelter, 10.50c.; sheet zinc, 21c.; oriental antimony, 37c. to 38c. On old metals, we quote buying prices for less than car load lots as follows: Copper wire, crucible shapes, 27c.; copper clips, 26c.; copper bottoms, 24.50c.; red brass, 24c.; yellow brass, 17.50c.; lead pipe, 8c.; zinc, 8c.; pewter, No. 1, 32c.; tinfoil, 40c.; block tin pipe, 45c.

St. Louis

March 26.—Non-ferrous metals have been rather quiet and stronger, with the exception of lead and spelter, the Missouri product having weakened somewhat during the week. The quotations at the close today were, in car load lots: Lead, 9.25c.; spelter, 10.50c. Less than carload lots: Lead, 10.25c.; spelter, 11.50c.; tin, 50c.; lake copper, 36.50c.; electrolytic copper, 36c. to 36.50c.; Asiatic antimony, 40c. In the Joplin district ore weakened as a result of the situation in the lead and spelter market and the basis range on zinc blende, 60 per cent metal, was \$75 to \$90 per ton, most of the decline being in the second grade ores. On miscellaneous scrap metals, we quote dealers' buying prices as follows: Light brass, 12.50c.; heavy yellow brass, 13.50c.; heavy red brass and light copper, 19.50c.; heavy copper and copper wire, 23c.; zinc, 7c.; lead, 5.50c.; tea lead, 3.50c.; pewter, 25c.; tinfoil, 35c.

New Heroult Furnace Installations

Licenses have been granted by the United States Steel Corporation for the installation of the following new Heroult electric furnaces:

The Hussey Binns Steel Company, Charleroi, Pa., will install two more 6-ton furnaces for making special steel. This company already has one 6-ton Heroult furnace in operation.

The Driver-Harris Wire Company, Harrison, N. J., will install one 2-ton furnace for making special alloys.

The Crucible Steel Company of America will install one more 6-ton furnace at its Harrison, N. J., plant for making special steel. This company already has in operation a 6-ton and a 3-ton Heroult furnace at this plant.

The Crucible Steel Company of America will install two 6-ton furnaces at its Parks Works, Pittsburgh. These will be used for making special steels.

The installation of these six furnaces will bring the total of this type, operating or contracted for in the United States and Canada, to 114. Of these 30 have been licensed since Jan. 1, 1917.

The Astra Electric Novelty Works, Inc., 45 East Seventeenth Street, New York, has been formed by a number of experts in dry batteries. A great demand has sprung up for batteries for flashlights and the company proposes to make a specialty of this business in America as well as in foreign countries. The factory, located at 152-156 Wooster Street, New York, is equipped with the most modern machinery and includes a laboratory for testing and experimental purposes.

PERSONAL

Albert H. Garry has been appointed auditor of the American Steel & Wire Company, succeeding Charles A. Vogt, deceased. Mr. Garry's original connection was with the accounting department of the Salem Wire Nail Company, Salem, Ohio, with which he started in 1889. In 1898 he removed to Cleveland to become chief accountant for the Cleveland district, of the American



ALBERT H. GARRY

Steel & Wire Company. In 1901, after the formation of the United States Steel Corporation, he was made assistant auditor of the American Steel & Wire Company and has continued in that capacity at the general offices in Cleveland. Mr. Garry's successor as assistant auditor is Samuel Dunlap, who has been connected with the company since 1899. He started with the Illinois Steel Company in 1895, in the treasurer's office at Chicago. He was made assistant auditor of the wire company at Cleveland in February, 1908, and was transferred to Chicago in a similar capacity in March, 1913. The appointment just made brings him again to the general offices in Cleveland. H. L. Cary has been appointed to succeed Mr. Dunlap as assistant auditor at Chicago. He started with the Elwood Wire & Nail Company in 1893. Later he was connected with the American Steel & Wire Company's accounting department in Worcester, Mass., and in Cleveland. Since 1904 he has had to do with the traveling work, having headquarters in Cleveland.

Waddill Catchings has been elected president of the Sloss-Sheffield Steel & Iron Company, Birmingham, Ala., to succeed James N. Wallace, president of the Central Trust Company of New York, who served as president of the Birmingham company for about a week following the retirement of Col. J. C. Maben, who was made chairman of the board. Mr. Catchings is a Mississippian by birth. He graduated from Harvard University in the arts course in 1901 and from the law college in 1904. He then took up the practice of law in New York and was associated with the firm of Sullivan & Cromwell. When the Milliken Brothers, Inc., was thrown in the hands of a receiver in 1907, Mr. Catchings operated the Long Island plant for the receiver until 1909. He performed a similar service for the Central Foundry Company when it became involved in financial troubles, and upon the reorganization of that concern was made president. He is also

president of the Central Iron & Coal Company, which has a furnace at Holt, Ala., and the Platt Iron Works Company, Dayton, Ohio. During the past year, under leave of absence from the other companies with which he is associated, Mr. Catchings has been actively identified with J. P. Morgan & Co., New York, in the department devoted to the purchase of supplies for the allied governments. He started last Saturday for Birmingham. It is expected that the new régime will inaugurate an active policy and that important additions will be made to the plants of the company. Henry Parsons of New York, one of the directors, has been in Birmingham since March 22 and has gone thoroughly into details of local management with the vice-presidents, J. C. Maben, Jr., and J. W. McQueen.

Fred E. Russell has sold the capital stock of the Aetna Foundry & Machine Company, Warren, Ohio, of which he was president and general manager, to M. W. McClane, W. W. Woodruff and other Pittsburghers. Mr. Russell has been operating the plant for 12 years, in which time he increased its working force from 20 to 100. He is retiring on account of poor health, but expects, after taking a needed rest, to again enter active business. In addition to its general foundry and machine-shop trade, the Aetna Company builds a large line of tinning machinery and wire machinery.

J. Edmund Good, formerly with the American Iron & Steel Mfg. Company, has joined the American Steel Export Company, Woolworth Building, New York, to take charge of a new department which is to be developed for the handling of bolts, nuts, railroad spikes, bar iron, etc.

L. K. Berry, district manager at New York for the Warner & Swasey Company, Cleveland, Ohio, has been appointed assistant sales manager, with headquarters at the home office. Eugene R. Gardner succeeds him and will be assisted by R. L. Glaser. These changes are effective April 1.

William H. Reece has been placed in charge of the grinding and polishing machine department of the Noble & Westbrook Mfg. Company, Hartford, Conn. He was superintendent of the Northampton Emery Wheel Company for 20 years and until recently was with the Reece & Hamman Company, Florence, Mass.

C. J. Bacon, formerly in charge of power plant work at South works of the Illinois Steel Company, has resigned to become associated with the Du Pont Powder Company, at Wilmington, Del. He will have charge of research work in a number of directions in which the powder company is extending its operations. Mr. Bacon is well known as designer of the Bacon waste-heat boiler and also as a collaborator with H. A. Brassert in the design of the Brassert-Bacon gas washing and drying system.

E. W. Richey has been elected vice-president of the Standard Forgings Company, Chicago. He was formerly assistant to the president.

Karl G. Roebbing, Trenton, N. J., second vice-president of the John A. Roebbing's Sons Company and secretary and treasurer of the Trenton Brass & Machine Company and Woven Steel Hose & Rubber Company, has been elected a member of the board of directors of the Mechanics' National Bank, Trenton, to succeed his father, Ferdinand W. Roebbing, Sr., recently deceased.

William B. Dickson, Montclair, N. J., second vice-president and treasurer of the Midvale Steel & Ordnance Company, has accepted an appointment on the State Board of Prison Inspectors of New Jersey. He is at present a member of the Prison Investigating Commission, from which, it is understood, he will resign before qualifying for the new appointment.

Augustine Davis, president Davis-Bournonville Company, Jersey City, made an address March 16 before 500 employees of the company, organized as a club, at a social entertainment at the Masonic Temple, Jersey City.

Harrison W. Craver, who has been chief librarian of the Carnegie Library of Pittsburgh since 1908 and in 1902 was assistant superintendent of the Allegheny Iron & Steel Company at Brackenridge, Pa., has ac-

cepted a position as director of the library of the United Engineering Societies of New York, a library which is believed to be the largest engineering library in the world, with approximately 150,000 volumes on technological subjects.

C. C. Rice, who has been connected with the Dover, Ohio, mill of the American Sheet & Tin Plate Company for 20 years, has resigned to become superintendent of the Deforest Sheet & Tin Plate Company, Niles, Ohio.

Carl W. Pierce has resigned as open-hearth superintendent of the Central Steel Company, Massillon, Ohio, and has accepted the same position at the new plant of the Cromwell Steel Company, Lorain, Ohio.

H. H. Roberts has been appointed chief engineer of the La Bella Iron Works, Steubenville, Ohio, succeeding William Forstrom, who resigned to go with the Youngstown Sheet & Tube Company, Youngstown, Ohio.

Howard Wood, Jr., son of the late president of the Alan Wood Iron & Steel Company, and assistant secretary of the J. Wood & Brothers Company, Conshohocken, Pa., will be made manager of the J. Wood & Brothers Company's plant now owned by the Alan Wood Company.

Joseph T. Ryerson & Son, Chicago, have made the following correction in their announcement of appointments, as given in THE IRON AGE of March 15: H. B. Kraut, mechanical engineer, heretofore in charge of machinery export sales, has been appointed manager of exports.

Edwin M. Brown, Columbia, Pa., has resigned his position as superintendent of the local plant of the A. M. Byers Company, effective April 1, to become assistant manager for Edward T. Edwards. Mr. Brown has been connected with rolling mills in Columbia for the past 12 years, beginning as a machinist and advancing steadily to his present position.

Charles F. McBride, Sr., formerly freight solicitor of the Pittsburgh office of the Rock Island Railroad, has resigned to become identified with the freight department of the Sharon Steel Hoop Company, Sharon, Pa.

F. Veithardt has resigned from the Vulcan Steel Products Company and has reopened an office for the United Steel & Metal Company at 90 West Street, New York.

Dr. E. Schrödter, for 35 years secretary of the Association of German Ironmasters and formerly editor of the Association's official organ, *Stahl und Eisen*, has retired. He is succeeded by Dr. O. Petersen, his assistant and collaborator for many years. Dr. Schrödter will continue to act as honorary treasurer, as he has been elected a member of the council. He will also retain his active interest in the "Iron Archives," a collection of antique chimney plates and fire-backs formed by him for the association.

The Combustion Engineering Corporation, 11 Broadway, New York, announces that Walter H. Wood, mechanical engineer, has become associated with its staff of combustion experts. He has a fine record as a combustion engineer, and leaves the position of superintendent of power plants of the Baltimore & Ohio Railroad to enter the employ of the Combustion Engineering Corporation as engineer of tests and research. He is one of a number of engineers of prominence who have either associated themselves with the corporation or who have sought to do so in the past 18 months.

W. S. Rugg, district manager of the New York office of the Westinghouse Electric & Mfg. Company, has been appointed to succeed Charles S. Cook as manager of the railroad department, with headquarters at East Pittsburgh. Mr. Rugg has been connected with the Westinghouse Company for over 20 years. E. D. Kilburn, manager of the power department of the New York office of the company, has been appointed district manager of that office to succeed Mr. Rugg. E. P. Dillon, formerly assistant to manager of the railroad and lighting department at East Pittsburgh, has been appointed manager of the power division of the New York office, succeeding Mr. Kilburn.

OBITUARY

JAMES H. HOYT, Cleveland, Ohio, attorney, and nationally prominent in the steel industry and in railroad and shipping circles, died at St. Augustine, Fla., March 21, after a short illness of grip, aged sixty-four. He was a director of the Cleveland-Cliffs Iron Company, a trustee of the Carnegie Pension Fund, general counsel and director of the American Ship-



JAMES H. HOYT

building Company, second vice-president, director and general counsel of the Hocking Valley Railroad Company, secretary and director of the Lake Superior & Ishpeming Railway Company, secretary and director of the Pittsburgh Steamship Company and of other Lake steamship companies, and a director of several Cleveland banks and trust companies. He was a member of the American Iron and Steel Institute and a regular attendant at its meetings, and, with his national reputation as a gifted after-dinner speaker, his name was always on the institute's program as a speaker at its dinners. He was a senior partner in the law firm of Hoyt, Dustin, Kelley, McKeehan & Andrews, Cleveland.

EDGAR BLESS DRAKE, Sr., secretary and treasurer of Bless & Drake, Inc., Newark, N. J., manufacturer of sad irons, died March 21, from asthma, aged 62 years. His uncle and business partner, James F. Bless, the president of the company, died Feb. 9, as noted in THE IRON AGE. Edgar B. Drake was born in Minerva, Ky., moving to Newark while a child. Following the organization of Bless & Drake, by Eleazer Bless and Robert Drake, his grandfather and father respectively, he was taken into the firm with the sons of Mr. Bless. He leaves two sons.

CHARLES W. SMITH, junior member of the firm of Albert Smith's Sons, iron manufacturers, Newark, N. J., died March 21, of pneumonia, after a short illness, aged 52 years. He had spent his entire life in Newark, and for many years had been identified with the iron business.

BURT H. WHITELEY, president Whiteley Malleable Castings Company, died March 21 at his home in Muncie, Ind. He had been president for 20 years, but had been in ill health for the past five years.

LOUIS WILLIAMS, Superior, Wis., for 25 years general superintendent of the Superior Shipbuilding Company, died March 22, aged 53 years.

WILLIAM N. GARTSIDE, president Diamond Clamp & Flask Company, Richmond, Ind., died March 4.

Machinery Markets and News of the Works

WAITING FOR WAR

Orders Held Up Until Congress Acts

No Large-Lot Buying—Chicago the Strongest Market—Heavier Sizes of Tools Selling Well—Export Trade Improves

While waiting for war machine-tool buyers are to a large extent withholding the placing of orders. As a consequence domestic purchases of new equipment have in the past week fallen off abruptly at New York and Detroit. In Cleveland business is quieter. In Chicago it is maintaining its recent level. No large-lot buying is reported anywhere, and in most cases orders are given only to meet pressing needs.

Turret lathes and screw machines are in good demand, and display more activity than other lines, although radial drills are in notable request at Chicago. For the time being this is the strongest buying center in the trade. Much of the scattered call for tools is for the heavier sizes. For example, No. 4 milling machine has sold well the past week. Previously the request had been confined mostly to Nos. 2 and 3.

Export trade seems to have recovered from the caution engendered by the U-boat threat. Some notable buying has been done for both France and Russia. One order has been booked for 100 turret lathes and screw machines for the former country for automobile manufacture and general shop work, and an inquiry has also come from there for 23 punches and shears for a car-building shop. Russia has bought heavily, particularly of forging and drilling machinery.

Shipyards have purchased little recently on account of the probability of the Government taking over their operation. Some large shipbuilding projects in the South are under consideration, one deal calling for about \$500,000 worth of machine-tools. About 50 more are to be installed in the addition to the Milliken hull-building plant on Staten Island.

Railroad congestion remains a drag on business. The New Haven Railroad has again embargoed most commodities, thereby once more seriously hampering deliveries. Shipments south and west of Chicago are improved, but are blocked eastward. Cincinnati reports some relief from these difficulties. On the Pacific coast car shortage is making it difficult to obtain materials urgently needed by the shipyards.

New York

NEW YORK, N. Y., March 28, 1917.

Domestic buying of new machine tools has fallen off. Machines are being sold for pressing needs, but most negotiations are held up pending the transition of industry to a war basis. Second-hand tools are daily becoming a more important factor in the trade. Even small-lot requirements, which have for some time been sharing with single tools most of the attention of the trade, are now quite noticeable by their absence. This shrinkage of business was not noticeable until about a week ago. Inquiry has fallen off decidedly, particularly for lathes and railroad shop equipment. Practically all industries in this section show this waiting tendency; the railroads, automobile plants and shipyards most noticeably. It is clear that the tools could be profitably used right now in many

cases, but the national crisis has dictated a hold-off policy for the time being.

The sluggishness of railroad buying in the East is marked. Compared with it a year ago the aggregate amounts to almost nothing. Some of their requisitions have been out and bids received four to six months ago, and still no action is taken. In this time prices on some lines have advanced three and four times. One tool builder is now quoting them subject to change without notice.

Export trade has been in striking contrast with the quiet home market. France has been buying a lot of machines for automobile and other plants. An order was booked a few days ago for 100 turret lathes and screw machines for delivery in that country. Another inquiry is for 23 punches and shears for a car-building shop. Automobiles Bérllet, Lyons, France, is seeking 7 electric cranes, supplementing a recent order for the same equipment. The call for forging machinery from Russia has been strong of late; also coming largely from bolt and nut works, car-building shops and automobile plants. Drill presses are in good demand from abroad both for munition work and general manufacturing.

The immediate prospect of the Government taking over the shipyards has been the prime cause of their postponing purchases. The Newport News Shipbuilding & Dry Dock Company, Norfolk, Va., has bought several punches and shears from among its recent requirements. Wallace Downey is in the market for about 50 tools for an addition to the plant of Milliken Brothers, Inc., which he recently acquired.

The General Electric Company is still purchasing equipment in small lots.

The Davison Chemical Company, Baltimore, Md., is spending a very large sum of money in the development of pyrites deposits on the coast of Cuba.

The chief of the Bureau of Yards and Docks, Navy Department, Washington, is having plans drawn for an extension to the machine shop of the navy yard, Brooklyn, N. Y., 150 x 400 ft., estimated to cost \$400,000.

The H. G. Trout Company, 226 Ohio Street, Buffalo, N. Y., will purchase a large floor type horizontal drilling, boring and milling machine, with 7 to 8-in. bar.

The West Side Foundry Company, Troy, N. Y., is in the market for a steam-driven air compressor in first class condition.

The Mott Sand Blast Mfg. Company, 893 East 134th Street, New York, is in the market for a power brake for bending to take 10 gage sheet 8 ft. long; a power squaring shear to take 10 gage sheet 8 ft. long, and a 5-ton hand power crane, 20 x 20 x 15-ft. lift. It will occupy its new plant in Brooklyn, N. Y., about April 1.

The Empire Axle Company, Dunkirk, N. Y., has awarded contract for an addition to its plant, 80 x 100 ft., one story, of brick construction, which will double its present capacity.

The Globe Silo Company, Sidney, N. Y., has increased its capital stock from \$25,000 to \$35,000 to provide for the growth of its business.

The Peerless Mill Supply Company, 31 Pearl Street, Buffalo, N. Y., has increased its capital stock from \$25,000 to \$50,000 to provide for its increased business.

The Aluminum Goods Mfg. Company, Newark, N. J., has awarded contract to Lockwood, Green & Co., Chicago, Ill., for a six-story reinforced concrete factory building, 65 x 350 ft., estimated to cost \$250,000.

The International Metal Mfg. Company, Jamestown, N. Y., has had plans drawn for a factory building, 60 x 100 ft., three stories, which it will erect at once. O. M. Otte is manager.

Maxwell Karge, Phoenix, N. Y., will build an addition to his machine shop on Jefferson Street, 40 x 80 ft.

The Hammond Steel Company, Syracuse, N. Y., manufacturer of tool and alloy steels, has let contract for an addition to its hammer shop.

The Hotaling, Warner Company, Syracuse, N. Y., has had plans completed for a boiler house addition, 39 x 40 ft., three stories.

The water board, Sherburne, N. Y., R. P. Kutschback, chairman, will take bids April 15 for a pumping station and a steam pump of 1000 gal. per min. capacity.

The Buffalo General Hospital, High Street, Buffalo, will erect a boiler house, 40 x 60 ft.

The Standard Optical Company, Geneva, N. Y., is having plans prepared for a two-story and basement factory and office building, 50 x 136 ft.

Akron, N. Y., is having plans drawn for an electric light plant, estimated to cost \$19,000. S. Sill is chairman.

The Buffalo Union Furnace Company, Buffalo, is building a one-story brick addition to its power house at Buffalo River and Katherine Street.

Pass & Seymour, Solvay, N. Y., have completed plans for a three-story and basement factory, 60 x 185 ft. J. W. Brooks is manager.

The Buffalo Foundry & Machine Company is building a one-story addition to its plant at Fillmore Avenue and the New York Central Railroad.

The R. Neumann Hardware Company, 9 St. Francis Street, Newark, N. J., manufacturer of trunk and bag hardware, has awarded contracts aggregating \$90,500, for two four-story additions to its plant, 52 x 110 ft., and 82 x 136 ft., respectively, at St. Francis and East Ferry streets.

The Hanovia Chemical & Mfg. Company, 233 New Jersey Railroad Avenue, Newark, N. J., will build a one-story addition to its plant, 30 x 60 ft. The company specializes in lustre colors and thermometers.

The Flockhart Ring Casting Company, Newark, N. J., has been incorporated with a capital of \$30,000 to operate a ring-casting plant. James Flockhart, D. Sensano, and D. Levand are the incorporators.

The Lyon Garage & Machine Company, Irvington, N. J., recently organized, will build a one-story machine shop and garage, 50 x 75 ft. Harvey W. Banks and Frederick Caesar are the proprietors.

The Butterworth-Judson Company, Avenue R, Newark, N. J., manufacturer of chemicals, has filed plans for two two-story structures, 47 x 120 ft., and 47 x 90 ft., to cost \$22,000.

The Die Casting Company of New Jersey, 16 Washington Avenue, Irvington, N. J., has been incorporated with a capital of \$200,000. J. Gustaf Hutlin, Edmund Sabo and Albert Garossy are the incorporators.

The Hyatt Roller Bearing Company, Harrison, N. J., is negotiating with the local council for the vacating of a number of streets near its plant to provide for proposed expansion.

The City Council, Elizabeth, N. J., is considering plans for a municipal electric lighting plant.

The plant of the Torrid Heater Company, Liberty Street, Hackettstown, N. J., manufacturer of steam and hot-water heaters, was reported destroyed by fire March 19.

The Safety Car Heating & Lighting Company, 206 Erie Street, Jersey City, N. J., manufacturer of railway cars, heating and lighting equipment, will make extensions in its plant to cost \$4,000.

The Keuffel & Esser Company, 300 Adams Street, Hoboken, N. J., manufacturer of surveying and engineering instruments and materials, is building an addition to its plant for the manufacture of range finders and periscopes.

The Patterson-Allen Engineering Company, Westside Avenue, Jersey City, N. J., manufacturer of steel nozzles, lugs, etc., will build a one-story shop addition.

The Standard Fuse Company, Bordentown, N. J., is said to be planning the reopening of its fuse plant for the manufacturing of automobile parts.

The German-American Stoneware Works, Keasbey, near Perth Amboy, N. J., manufacturer of sanitary porcelain and magnesia materials, has increased its capital stock from \$450,000 to \$2,000,000 for extensions. The company has also filed notice of change of corporate name to the General Ceramics Company. Lewis Gunther is president and Percy C. Kingsbury is secretary.

Construction is progressing rapidly on the new plant of the Aeromarine Plane & Motor Company, East Keyport, N. J., a structure 150 x 300 ft.

The Mutual Aircraft Corporation, Asbury Park, N. J., has been incorporated with a capital of \$125,000 by William C. Hurst and Adam C. James, Bradley Beach; Adolph Wittman, Stapleton, S. I., N. Y.

The Crescent Insulated Wire & Cable Company, 240 West Fifty-fifth Street, New York, has increased its capital from \$250,000 to \$1,000,000. C. Edward Murray is president.

The Eberhard Faber Pencil Company, 39 Greenpoint Avenue, Brooklyn, N. Y., will build a new plant on Java Street, near West Street, Greenpoint, Long Island, to cost about \$100,000.

The Nichols Copper Company, Hobson Avenue, Laurel Hill, Long Island, N. Y., will build an addition to its plant, 100 x 114 ft., to cost \$32,000.

Philadelphia

PHILADELPHIA, Pa., March 26, 1917.

The Alvord Reamer & Tool Company has been incorporated with a capital stock of \$250,000. It has purchased all the property of the Alvord Reamer Company, and the Millersburg Fifth Wheel Company, both of Millersburg, and will continue the two businesses. The officers of the Alvord Reamer & Tool Company are as follows: F. T. McGuire, president; G. R. Kurrie, vice-president; J. Boyd Coates, secretary, and John Clymer Boltz, treasurer. The company will manufacture metal-cutting tools, such as reamers, milling cutters and special tools of every description. The capacity of the present tool plant and forging department has been materially increased to take care of the heavy demands for these products.

The Navy Department, Washington, is receiving bids up to March 31 for the erection of a one-story machine and electrical shop, 130 x 325 ft., at the League Island Navy Yard, Philadelphia.

S. G. Matthews & Co., 916 North Ninth Street, Philadelphia, are in the market for structural punches, angle shears, a Pels beam shear, drill presses, bolt cutters and headers.

F. A. Poth & Sons, Inc., Thirty-first and Jefferson streets, Philadelphia, has awarded a contract for a one-story concrete and brick boiler plant, 46 x 50 ft., to cost \$30,000.

The Atwater-Kent Mfg. Works, 4937 Stenton Avenue, Philadelphia, manufacturer of ignition specialties, has awarded contract for a two-story brick and concrete plant at Wayne Junction to cost \$75,000.

The National Umbrella Frame Company, Thirtieth and Thompson streets, Philadelphia, will build a new one-story brick factory, 56 x 65 ft., at Penn and Belfield streets.

H. P. Erdman, Philadelphia, has awarded contract for an addition to his machine shop at D Street and Erie Avenue to cost \$20,000.

The Sun Shipbuilding Company, Chester, Pa., is reported planning additions to its works the coming summer. It has 50 acres of property available. Construction will soon commence on another new unit to its plant.

The Union Supply Company, Scranton, Pa., has been incorporated in Delaware with a capital of \$30,000, to engage in the machinery supply business. James L. Gaynor, Harry A. Smith and William J. Bengier, Scranton, are the incorporators.

The Crown Smelting Company, Concord Avenue and Patterson Street, Chester, Pa., manufacturer of babbit metal, brass and bronze products, has commenced the erection of a two-story brick addition to its plant.

Fire March 26 damaged the plant of the World Polish Mfg. Company, College Avenue, York, Pa., manufacturer of polishing preparations, with loss of about \$25,000.

The North American Motors Company, Pottstown, Pa., has taken bids for an additional building, one and two stories, 73 x 362 ft., of brick and steel.

The H. T. Shearer Machine Company, Lancaster, Pa., is being organized to establish a plant for general machine work. H. T. and G. T. Shearer and W. H. Strauss, formerly of Lancaster, now with the Waynesboro Foundry & Machine Company, Waynesboro, are the promoters.

The Industrial Foundry & Machine Company, Laurel and Washington streets, Pottstown, Pa., manufacturer of steam fittings and plumbers' supplies, has commenced the erection of a new foundry, 50 x 135 ft., with wing, 30 x 30 ft. Following the completion of this building the present plant will be used as a machine department.

The machine shop, blacksmith shop and carpenter shop at the Lytle Colliery, near Minersville, Pa., which were destroyed by fire March 18, will be rebuilt. The Susquehanna Coal Company, Wilkes-Barre, operates the property.

The plant of the Jeaneville Iron Works, Hazleton, Pa., was damaged by fire with a loss of about \$50,000 on March 23. The loading department suffered the greatest loss. The company is now producing shells for the United States Government.

The Cattie Brothers Company, Philadelphia, has been incorporated with a capital stock of \$60,000 to galvanize, tin and treat by coating, bars, plates, bolts, metals, etc. The incorporators are Joseph, Nicholas, Henry, Walter, William and Chyllene L. Cattie, 2108 North Hancock Street.

The Keystone Reamer & Tool Company, Millersburg, has been incorporated with a capital stock of \$35,000 to manufacture reamers, taps, dies, drills, tools, etc. The incorporators are H. G. Frederick, J. F. Bradenbaugh and W. P. Miller.

New England

BOSTON, MASS., March 26, 1917.

The New Haven Railroad has been compelled to put in force again practically all the embargoes which were lifted when the railroad strike situation was relieved. Deliveries of all kinds of raw materials and finished products are therefore seriously hampered. Most manufacturers are inclined to make the best of a bad condition and not so much complaint is heard as was the case before the true railroad situation in New England had been fully comprehended. Recent statistics show that Connecticut alone has been making 55.4 per cent of all the munitions manufactured in this country, and the railroad serving that State has been flooded with business every time it has attempted to lift the embargoes.

The Fore River Shipbuilding Corporation, Quincy, Mass., has decided to expend about \$1,500,000 to build a new set of ways as a result of receiving a contract to build one of the new battle cruisers. This will be the largest single improvement made at the yard since it was opened 15 years ago.

The Hersey Mfg. Company, Boston, Mass., has been incorporated with a capital stock of \$500,000 to manufacture meters, motors and machinery. Francis C. Hersey is president and Francis C. Hersey, Jr., treasurer. These, with W. A. Hersey, are directors.

The Metal Specialty Company, New Britain, Conn., has been incorporated with a capital stock of \$25,000 by Eugene F. Schoell, Fred W. Stingle, Frank G. Gehring, Bernard B. Boyle and Bernard F. Clark.

The Westgard Machine Company, Wakefield, Mass., has been incorporated with a capital of \$10,000. John G. Cowie is president and Ole Westgard, Wakefield, treasurer. They and William P. French are directors.

The Chase Metal Works, Waterbury, Conn., will erect a building, 30 x 160 ft., one story, on Thomaston Avenue.

Neff & Morse, Boston, Mass., have been incorporated with a capital of \$10,000 to manufacture machinery. Allen J. Morse is president and Charles W. Neff, Milton, treasurer. They and M. V. Morse are directors.

The J. T. Slocumb Company, Providence, R. I., has awarded a contract for two additional stories to its factory, 45 x 100 ft., with ell 16 x 58 ft.

The Auto Gas Register Company, Waterbury, Conn., has been incorporated with a capital of \$300,000. The incorporators are W. N. Howden, New York, and Francis T. Reeves and H. M. Swenson, Waterbury.

The Woonsocket Machine & Press Company, Woonsocket, R. I., is building an addition, 80 x 105 ft., one story, to house the machinery of the Campbell Textile Machinery Company, Auburn, R. I., whose business it recently purchased.

The Van Norman Machine Tool Company, Springfield, Mass., has purchased about 3½ acres for the expansion of its plant. The company recently increased its capital to meet the growing demands of its business.

The Lawrence Machine Gun Mount Company, Springfield, Mass., has been incorporated with a capital stock of \$100,000. The directors are Willse Lawrence, president; James Campbell, South Deerfield, treasurer, and Stuart M. Robson.

The A. J. Beaton Mfg. Company, New Britain, Conn., has been incorporated with capital stock of \$50,000 to manufacture automatic air valves, ceiling plates, etc. The incorporators are A. J. Beaton, J. W. Marsland and B. A. Macristy.

The Hendey Machine Company, Torrington, Conn., has had plans drawn for two additions, each 80 x 125 ft., four stories, one for factory purposes, the other for a storehouse.

The Quality Saw & Tool Works, Napier Street, Springfield, Mass., will build an addition to its factory to cost \$6,000.

The Union Iron Works, Bangor, Me., established in 1827 and long well known as a manufacturer of sawmill machinery, is constantly increasing its force, now engaged in the manufacture of pulp mill machinery, a new line produced by the company.

The American Chain Company, Bridgeport, Conn., has awarded a contract for an addition, 50 x 300 ft., three stories.

The Farrel Foundry & Machine Company, Ansonia, Conn., is erecting an addition, 105 x 174 ft., one story.

The Massam Company, Springfield, Mass., has been incorporated with authorized capital stock of \$500,000 to manufacture mechanical and electrical equipment for automobiles. The directors are Charles F. Munder, president; Frank W. Arthur, 126 Fort Pleasant Avenue, treasurer, and George H. Morgenstern.

Frank H. Trego, Springfield, Mass., has bought land and factory buildings at Fox and Ferry streets, New Haven, Conn., formerly a part of the plant of the A. C. Gilbert Company. The buildings consist of a main structure, 60 x 220 ft., with ell, 52 x 56 ft., two stories; two buildings, each

50 x 100 ft., two stories, and a heating and power plant. Mr. Trego is to use them for the manufacture of high-powered motors for aeroplanes, automobiles and motor boats.

The Gorham Mfg. Company, Providence, R. I., has voted to increase its capital stock from \$5,000,000 to \$6,000,000.

The Graniteville Foundry Company, Westford, Mass., has been incorporated with capital stock of \$16,000. The directors are Allan C. Sargent, president; Charles G. Sargent, Graniteville, treasurer; and W. F. Sargent.

The J. R. Hardy Iron & Metal Company, New Bedford, Mass., has been incorporated with authorized capital stock of \$10,000. Ralph B. Clark, Everett, is president; Hubert A. White, Stoughton, treasurer; and Anna H. Cahill, Malden, clerk.

The Tyler Mfg. Company Boston, Mass., has been incorporated with a capital stock of \$10,000 to manufacture motor devices. The directors are Lucius S. Tyler, 64 Pearl Street, president and treasurer; A. P. Teele and I. S. Allen.

The Dowling Iron & Steel Company, 53 State Street, Boston, has been organized by M. A. Dowling, with shops at Lawrence and Roxbury, Mass.

The R. Wallace & Sons Mfg. Company, Wallingford, Conn., is in the market for a rotary slitting shear for sheets ½ in. thick by 16-in. wide.

Baltimore

BALTIMORE, MD., March 26, 1917.

The Victor Cooler Door Company, 12 Maryland Surety & Trust Company Building, Baltimore, has been incorporated with \$35,000 capital stock to manufacture cold-storage doors, fasteners, ice chutes, refrigerators, refrigerator plants, etc. The incorporators are Richard E. Jones, C. Howard Kretzer and William Wingert.

The Arundel Shipbuilding Company, Fairfield, Md., will soon begin work on its plant. The first building will be 50 x 145 ft.

The Union Smelting & Refining Company, 805 South Wolfe Street, Baltimore, has acquired a building, 135 x 150 ft., at Howard and Ostend streets. George A. Kroenert is manager.

The Carnegie Steel Company, Bush and Wicomico streets, Baltimore, will build a powerhouse 42 x 62 ft., at Gunpowder and Severn streets at a cost of about \$5,000.

The Baltimore Drydock & Shipbuilding Company, foot of Martin Street, Baltimore, will build a two-story building, 38 x 51 ft., to cost \$4,000.

The Taber-Davidson Company, manufacturer of fiber, has acquired the property of the Mineral Products Company, Wilmington, Del., and will establish a plant with motor-driven equipment. Harry B. Taber is president and Charles E. McCarroll is secretary.

Chicago

CHICAGO, ILL., March 26, 1917.

Several indications are noted that users of machine tools who have hesitated over entering the market because of high prices have at last come to the conclusion that nothing will be gained by waiting, with the result that new and important inquiries are in hand. Business is quite generally reported to be fully up to the level of recent months, while some dealers, having in mind the appearance of additional important lists, assert that the increase in demand amounts to a revival of activity.

The Santa Fé, which has been an active buyer for some weeks, has entered the market with a supplementary list including one 24-in. x 16-ft. engine lathe, with taper attachment; one 18-in. x 10-ft. engine lathe; one 36 x 36-in. x 12-ft. planer, and one 30 x 30-in. x 8-ft. planer.

The Chicago, Milwaukee & St. Paul Railway has issued a list embracing about 20 machine tools, including lathes, boring mills, grinding and planing machines, and hydraulic presses. It is also inquiring for 6 wood-working machines.

The Chicago, St. Paul, Minneapolis & Omaha Railway has not yet closed for all the tools it has under inquiry.

Armour & Co., Chicago, are inquiring for a notable list of motor-driven tools required in its repair shops.

The Rock Island Arsenal has an inquiry out for the following tools:

- One 36-in. Bullard vertical turret lathe.
- One 42-in. Bullard vertical turret lathe.
- Three 24-in. double back-geared lathes.
- One 6-ft. full universal radial drilling machine.
- Two No. 2 B plain single pulley milling machines.
- One No. 3 Brown & Sharpe universal milling machine.
- Two ¼-in. riveting machines.
- One spring coiling machine.
- One back-geared double cam press.

A considerable part of the miscellaneous demand is for the heavier sizes of tools. The demand for presses indicates that the stamping trade is very active. For radial drilling machines also, the call is notable. In this section deliveries of standard tools are further off than is satisfactory to buyers, and the situation is made worse by the backwardness in deliveries of electric motors and control devices for motor-driven equipment.

The volume of used machines offered by firms who have had munitions contracts is likely to be increased in the near future. No adverse results from such offerings have been experienced by the trade up to the present time. Not much is to be feared from those war machines which are special in type and those of standard caliber probably will be readily absorbed without upsetting the market, if present conditions continue.

Deliveries on planing machines are especially difficult to procure, the larger sizes requiring from 5 to 7 months.

Bids for a three-story, reinforced concrete factory, 94 x 299 ft., at Aurora, Ill., are being taken by F. M. Barton & Co., 178 Jackson Boulevard, Chicago.

A five-story building, 75 x 140 ft., to cost \$125,000, is to be built for E. W. Bredemeier, care Davidson & Weiss, architects, 53 West Jackson Boulevard, Chicago.

The William Clader Machine Works has purchased a site at Randolph and Williams streets, Chicago, and will build a factory.

A machine shop to cost \$20,000 will be erected by Peter Terwilliger, 2012 Carroll Avenue, Chicago. C. T. Johnson, 79 East Adams Street, is the architect.

A machine-shop addition, 100 x 300 ft., is to be built at Moline, Ill., for the Moline Plow Company.

The Federal Cartridge Company, Anoka, Minn., is preparing plans for a machine shop for the manufacture of dies and a power house to cost \$60,000. P. R. Seidell, 1913 Dupont Street, Minneapolis, is president.

The Brady Foundry Company, Thirty-fourth Street and Western Avenue, Chicago, will build a new foundry.

The Champion Foundry & Machine Company, 2423 West Fourteenth Street, Chicago, is planning to build a new foundry.

The Thuren Mfg. Company, Eveleth, Minn., has been incorporated with a capital stock of \$150,000 to manufacture machinery. Among the incorporators are Theodore H. Peterson and L. O. McGee.

Contracts have been let for an addition to the factory of the Modern Die & Plate Press Mfg. Company, Belleville, Ill., to cost \$8,000.

Plans are being prepared by Marshall & Fox, architects, Chicago, for a three-story concrete and steel factory at Ontario Street and Fairbanks Court, to cost about \$150,000, for the Automatic Vending Company. It will manufacture food dispensing machines.

Work is to be started at once at Gary, Ind., on a factory to cost about \$25,000 for the Central Metallic Door Company, Chicago.

The Davenport Mfg. Company, manufacturer of baling presses, Davenport, Iowa, has broken ground for a new building to be added to its plant. W. H. Martin is general manager.

The Steel Fixture Mfg. Company, Topeka, Kan., suffered a serious fire loss recently. It is rebuilding and plans to have the plant again in operation the first of April.

Cleveland

CLEVELAND, OHIO, March 26, 1917.

The demand for turret lathes in lots up to 10 machines has improved the past few days. A part of this increased activity is due to the demands of the United States Government for some lines of war equipment. The call for automatic screw machines continues active. Business with local machine-tool houses has been a little quieter the past week owing to the absence of inquiries for round lots of machines, but a steady call for single tools and small lots of machines for quick delivery is noted. One Cleveland machine-tool manufacturer has placed orders for three large planing machines for extended future delivery, and some other business has come from local machinery manufacturers.

The Ashtabula Rapid Transit Company, Ashtabula, Ohio, is in the market for several machine tools.

The Standard Equipment Company, Cleveland, recently incorporated with a capital stock of \$300,000, will manufacture automobile parts and has acquired a 12-acre site at Lorain Avenue and West 106th Street, where it has commenced the erection of a plant. This will include a main building, 100 x 160 ft.; a forge shop, 50 x 80 ft., and a boiler house, 32 x 42 ft. The forge shop equipment will include 7 Billings & Spen-

cer board drop hammers, ranging from 800 to 2000 lb. The main buildings will include a machine shop and tool room, contracts for the equipment of which have been placed. The company's offices at present are in the Schofield Building. G. G. Peckham is president; A. J. Ashman, vice-president; Fred C. Dorn, secretary, and Walter C. Baker, treasurer.

A factory to manufacture sheet-metal parts for automobiles, such as fenders, hoods, gas tanks, etc., will be built in Cleveland shortly by a company with a capital stock of \$500,000, organized by the J. W. Murray Mfg. Company, Detroit, Mich.

The East Shore Machine Products Company, Cleveland, recently incorporated with a capital stock of \$30,000, will build a factory on East 140th Street to manufacture screw machine products. Contracts for the first unit, 40 x 80 ft., and for some machinery equipment have been placed. A. M. Gottschalt is president.

Bids will be received shortly by the Burchard, Roberts, Wales Company, architect and engineer, Cleveland, for three new buildings for the Ohio Forge Company, Cleveland, 40 x 120 ft., 50 x 125 ft., and 70 x 150 ft., respectively.

The Arthur Vulcanizing Machine Company, Warren, Ohio, has acquired a site for a new factory adjoining the plant of the General Malleable Company. At present the Vulcanizing Company occupies a portion of the building of the Malleable Company.

The Whitman & Barnes Mfg. Company, Akron, Ohio, has increased its capital stock from \$2,200,000 to \$2,500,000, with a view, it is stated, of enlarging its facilities.

The Portage Rubber Company, Akron, is planning a large addition to its factory.

The Sterling Cord Tire Company, Chicago, has purchased the plant of the American Case & Register Company, Salem, Ohio, and contemplates equipping it to manufacture automobile tires.

The Toledo Commutator Company, Toledo, Ohio, has been incorporated with a capital stock of \$50,000 and will manufacture commutators in the building of the Toledo Brass & Novelty Company. L. A. Alexander, S. N. Sloan and others are active in the enterprise.

The Kuenz Radiator & Sheet Metal Company, Toledo, has been incorporated with a capital stock of \$50,000 to manufacture automobile radiators. It is successor to the business of Joseph Kuenz.

Detroit

DETROIT, MICH., March 26, 1917.

The past week has been extremely quiet in the machine-tool market. Dealers state that manufacturers are awaiting the outcome of the international crisis. No large orders were placed, and miscellaneous orders were unusually small. It is pointed out by some in the trade that whereas many companies would place large orders if war develops, others would cancel orders pending. Deliveries remain about the same, standard machines requiring from 5 to 7 months. Present conditions have resulted in conservatism in business aggressiveness. Customers awaiting deliveries are extremely anxious to get their goods, which are being rushed through with all possible dispatch. Present developments are holding up the starting of new companies and projects, and the larger financing of going ones.

The Famous Truck Company, Inc., St. Joseph, Mich., capitalized at more than \$2,000,000, will erect a plant at once to manufacture a light weight automobile delivery truck. The company is backed by the McIntyre Company, Ltd., Chicago. Clayton Frederickson is general manager. Machinery will be ordered immediately.

The Hamilton Motor Company, Grand Haven, Mich., is preparing its building for occupancy and will start operations within a short time.

It has been announced that the States Motor Company, Kalamazoo, Mich., will be reorganized with a capital of \$6,000,000. It will include the States Motor Company and the States Motor Car Mfg. Company.

The Holland Demountable Wheel Company, capitalized at \$20,000, has been organized at Holland, Mich. Glen Thayer is president, and C. H. McBride, secretary and treasurer.

The Loudon Mfg. Company, Grand Rapids, Mich., has been incorporated with a capital of \$20,000 to manufacture novelty showcases. A. T. Moore is president and Ray W. Harris, secretary and treasurer.

It is announced that the Ford Motor Company, Detroit, is increasing its capacity to 3000 automobiles a day. In January 2616 cars were turned out each working day.

The Duplex Truck Company, Lansing, will build a plant to cost \$1,000,000 on a 15-acre tract. The first unit will be 600 ft. long.

The Industrial Foundry Company, St. Johns, Mich., will

commence work on a new building soon. New equipment will be installed which will double the output.

The Michigan Tile & Accessories Company, Grand Rapids, Mich., has been incorporated with a capital of \$90,000 by Folmer W. Kehlet and Frank J. Boders.

The Saginaw Malleable Iron Company, Saginaw, Mich., has increased its capital stock from \$350,000 to \$400,000.

The capital stock of the Lutz Furniture Company, Grand Rapids, Mich., has been increased from \$250,000 to \$400,000.

Work is being rushed on the car repair shop of the Grand Trunk Railway at Port Huron, which is expected to be completed by June 15.

The Michigan Hearse & Motor Company, Grand Rapids, Mich., will build a brick and steel factory to cost \$18,000.

The Armstrong Steel Spring Company, Flint, Mich., has changed its corporate style to the J. B. Armstrong Mfg. Company. The company suffered a loss by fire March 2 estimated at \$25,000, throwing out about 75 workmen temporarily.

The Ireland & Matthews Mfg. Company, Detroit, Mich., manufacturers of stove trimmings, sheet-metal goods and automobile supplies, is erecting a plant on a site of about seven acres, bounded by Beard, Chatfield and Green avenues and the Michigan Central Railway at an estimated cost of over \$500,000 and containing more than six acres of floor space. The main building will be 60 x 656 ft., four stories, with a one-story stock room, 60 x 638 ft. The power plant will be 51 x 178 ft.; the brass foundry, two stories, 56 x 129 ft., and the heavy press building, 75 x 568 ft. The plant is to be ready for operation about next June.

The Gier Pressed Steel Company, maker of stampings, Lansing, Mich., has not sold any part of its business to the Reo Motor Car Company of Lansing, except its former factory, which it recently vacated to take possession of its present buildings.

The Atlas Screen Company, Wyandotte, Mich., has been incorporated at Dover, Del., with a capital of \$100,000 to manufacture screens and wire goods. E. V. Mercer, Wyandotte; William F. Higgins and John R. Calhoun, Detroit, Mich., are the incorporators.

The Michigan Dredge Company, Bay City, Mich., has engaged in the manufacture of dredges, general machinery and implements, with a capital stock of \$30,000.

The Gile Tractor Company, Ludington, Mich., has doubled its working force and is increasing its output.

Milwaukee

MILWAUKEE, Wis., March 26, 1917.

Makers and sellers of machine tools in this district report that demand from all parts of the country shows no sign of a let up. No large-lot buying is reported, nearly all of the orders being for single tools or a small assortment. Some improvement is noted in deliveries west and south of Chicago, but Eastern shipments are still hampered to an unusual extent by car shortage and the acute traffic congestion. In some instances buyers have been able to get prompt delivery by paying express charges on shipments. Traffic conditions still are highly unfavorable, and reports from the interior of Wisconsin state that foundries have been obliged to cease operations because they have run out of coke supplies. Coal, also, is scarce everywhere. Dealers in mechanics' tools report a great scarcity of stocks, especially instruments like micrometers, gages, etc. It is said that some of these manufacturers are more than 12 months behind on orders. General industrial activity continues to broaden in spite of many handicaps.

The Lipman Car & Refrigerator Company, Beloit, Wis., has engaged W. W. Robinson, architect and engineer, to prepare plans for its new plant, to be located on a tract of 20 acres just acquired. This plant will have a capacity of equipping about 12,000 cars annually, and will consist of a foundry, machine shop, wood-working shop, sheet metal-working shop, sheds, warehouses, storage tracks, etc. Four buildings will be 40 x 250 ft., and two, 50 x 300 ft.

The Pressed Steel Tank Company, Milwaukee, has started the construction of four additions, one each to the main shop, boiler house, warehouse and shipping house on Greenfield Avenue, West Allis.

The Riverside Marine Machinery Company, Milwaukee, has been incorporated with a capital stock of \$3,000 by Daniel P. McCarthy, Charles Bendschneider and Christopher Skatt.

The Lamson Truck & Tractor Company, Wausau, Wis., will award contracts about April 28 for its new factory group at Wausau. Plans are being prepared by Swarthout & Speer, architects, for a main building, 200 x 300 ft., of brick, steel

and concrete, with steel sash sides and monitors. The shop is to be ready about June 15. E. R. Burley is chief engineer.

The American Pattern & Mfg. Company, Racine, Wis., has been organized by Sinius Christensen and Hans Nelson to establish a general wood and metal pattern works at Eighteenth and Racine streets. The company will employ 20 to 25 men at the start.

The Miltosa Company, Milwaukee, has been incorporated with a capital stock of \$2,000 by Harry A. Clum, Lynn S. Pease and R. Denniston. It will devote the next six months to experimental work and will then establish a manufacturing plant.

The Osborne Casting Company, Racine, Wis., started operations March 19 in its new gray-iron foundry. It will produce furnace castings and other material. The officers are: President and treasurer, John H. Osborne; vice-president, Mrs. Fannie Osborne; secretary and general manager, Charles J. Holmes.

The Two Rivers, Wis., Plating Works has been incorporated with a capital stock of \$40,000 to succeed to the business established by Henry Mixa several months ago. Mr. Mixa, Emil Frenz and A. Schmuluman continue to hold the chief interest. The present plant is overcrowded and an addition is contemplated.

The Mueller Foundry Company, Cedarburg, Wis., has been incorporated with a capital stock of \$6,000 to operate the former Cedarburg Foundry Company's plant, which was leased some months ago by Walsh & Heid, West Allis, Wis., but later abandoned. John Lauterbach, owner of the property; Oscar J. Hurth and Emil Mueller, formerly superintendent of the Cedar Grove Foundry Company, Cedar Grove, Wis., are the chief stockholders.

Vaughn & Meyer, consulting engineers, Majestic Building, Milwaukee, are taking bids for a turbine-driven centrifugal feed pump, one 3000-hp. feed-water heater and water meter unit for the new power plant of the Marathon Paper Mills Company at Rothschild, Wis.

The Westinghouse Lamp Company, New York, has purchased the branch plant it occupies in Milwaukee at 3100 Center Street. Additions to occupy the remainder of the property are contemplated. F. M. Wickes is manager.

The Eastern Wisconsin Electric Company, Sheboygan, Wis., which recently consolidated the Wisconsin Traction Company, Oshkosh, Wis.; the Eastern Wisconsin Railway & Light Company, Fond du Lac, and the Sheboygan Electric Company, has made a bond issue of \$998,000, a large part to be used for the construction of a 5000 to 6000-hp. steam power plant at Sheboygan and the construction of transmission lines to Oshkosh and Fond du Lac. Raymond H. Smith, Sheboygan, is general manager.

The Minneapolis, St. Paul & Sault Ste. Marie Railway Company, Minneapolis, will enlarge its roundhouse at Stevens Point, Wis., from an 8-stall house to one with accommodations for 20 to 22 locomotives. F. H. Urbahns is division superintendent at Stevens Point.

The Kiel Woodenware Company, Kiel, Wis., maker of pails, barrels, etc., has purchased a five-acre site at Campbellsport, Wis., for its proposed branch plant to be erected this year.

The Farm Tractor Company, Fond du Lac, Wis., has been organized with a capital stock of \$20,000 by G. I. Jones, T. L. Doyle and A. V. Connell to manufacture tractor and truck units for application to the Ford chassis. It has arranged with the Giddings & Lewis Mfg. Company, Fond du Lac, for factory space and plans a production of 5000 machines the first year.

The Central City Iron Works, Stevens Point, Wis., closed its foundry March 19 because of its inability to obtain coke. The furnaces will be banked. The machine shop is being kept in operation.

F. W. Wussow, 411 Prairie Street, Milwaukee, will rebuild the structures at that address into a public garage and repair shop at a cost of \$10,000. A number of tools will be installed.

The Sparta Brush Company, Eagle River, Wis., has been repurchased by interests at Sparta, Wis., and will be removed to the former location April 1.

The Stewart-Warner Speedometer Corp., Chicago, has disposed of its electric clock business, developed at the Warner Works in Beloit, Wis., to the Waverly Novelty Company, Pittsburgh, which will continue to manufacture the devices at Beloit, under the direction of E. M. Thompson. For the present quarters will be leased from the Stewart Company, but later a complete plant will be equipped in Beloit.

The Ampco Rolling Mills Corporation, Milwaukee, Wis., has been incorporated at Dover, Del., with capital of \$1,000,000, to operate steel and bronze rolling mills. Edgar E. Warner, Peter Weber and A. E. Martin, Milwaukee, are the incorporators.

Indianapolis

INDIANAPOLIS, IND., March 26, 1917.

The Modern Electric & Machine Company, Indianapolis, has increased its capital stock from \$5,000 to \$35,000.

The Johnson Excelsior & Mfg. Company, Indianapolis, has increased its capital stock \$20,000 to \$30,000.

The Spacke Machine & Tool Company, Indianapolis, a reorganization of the F. W. Spacke Machine Company, has been incorporated with \$225,000 capital and has added automobiles to its line of manufacture. The directors are Anton Vonnegut, James R. Shortt and Daniel S. Brooks.

The capital of the Indianapolis Electric Supply Company, Indianapolis, has been increased from \$70,000 to \$150,000.

The Knox Stamping Company, Knox, Ind., has been incorporated with \$5,000 capital stock to manufacture toy pistols and other novelties. The directors are Harvey L. Gaddes, Verne S. Gorrell and Ralph W. Kline.

The Pioneer Box Company, Crawfordsville, Ind., has increased its capital stock \$115,000, making the total \$250,000.

The Evansville Sanitary Company, Evansville, Ind., has been incorporated with \$100,000 capital stock to manufacture ash cans and similar articles. The directors are Benjamin S. Stern, John W. Spencer, Jr., and Morris J. Stern.

The John C. Frederickson Mfg. Company, Miller, Ind., has been incorporated with \$25,000 capital stock, to manufacture engines, air compressors and power producing machinery. The directors are John C. Frederickson, Alfred T. Thompson and H. O. Egeberg.

The Goshen Electric Material Company, Goshen, Ind., has been incorporated with \$30,000 capital stock to manufacture electrical material. The directors are Arthur F. Ernest, Hugh P. Castetter and Cornelius B. Miller.

Contracts have been signed with the Gary Motor Truck Company and the Central Metallic Door Company, Chicago, which will give Gary, Ind., two more factories.

The Aerothrust Engine Company, Laporte, Ind., has increased its capital stock from \$100,000 to \$500,000.

Irvin Robbins & Co., Indianapolis, manufacturers of automobile bodies, have increased their capital stock from \$8,000 to \$100,000.

The Lynch Glass Machinery Company, Anderson, Ind., has been incorporated with \$10,000 capital stock to manufacture glass-making machinery. The directors are James W. Lynch, Edward G. Bridges and Spencer M. Hickman.

The Fort Wayne Corrugated Paper Company, Hartford City, Ind., is preparing plans for the enlargement of its plant.

The Newtown Water Company, Newtown, plans to construct a water plant estimated to cost \$25,000.

The Standard Oil Company of Indiana, with headquarters at Whiting, has increased its capital stock from \$30,000,000 to \$100,000,000 to enlarge its present plants and build new ones.

The International Steel & Iron Company, Evansville, Ind., has issued \$150,000 of preferred stock.

The Clover Leaf Machine Company, South Bend, Ind., has been incorporated with \$10,000 capital stock to manufacture machinery. The directors are W. H. Holland, G. A. Harrop and F. H. Stuckey.

The Diamond Chain & Mfg. Company, Indianapolis, will build a new plant to cost \$200,000, on a 6-acre tract at Kentucky Avenue and West Street. The first unit will be one-story, 80 x 300 ft. This will be followed by a four-story building, 60 x 400 ft., to house the main plant. There will be 108,000 sq. ft. of floor space in the two units. The present plant has 75,000 sq. ft. About 700 men are employed. Lucius M. Wainwright is president; Guy A. Wainwright, vice-president; Albert D. Johnson, secretary-treasurer, and D. McWorkman, general manager.

The American Steel & Foundry Company, Indiana Harbor, Ind., which has been making ammunition, has temporarily closed its plant and discharged 400 men.

The Pathfinder Automobile Company, Indianapolis, Ind., has increased its capital stock to \$5,000,000. The company has booked orders for three times the number of automobiles it had anticipated for this year and the plant will be enlarged at once. It will manufacture several parts that heretofore have been bought from other manufacturers. W. C. Teasdale, Jr., is president; W. E. Stalnaker, vice-president; W. K. Brundley, secretary-treasurer.

The Portland Forge & Foundry Company, Portland, Ind., has let contracts for three new buildings which will double the capacity of its drop forge, machine and foundry departments. This is the second enlargement within the last year. D. A. Hall is secretary and treasurer.

It is reported that work on new machine, tool and car repair shops at Richmond, Ind., will be started this summer

by the Pennsylvania Railroad, plans for which were made several months ago. It has set aside \$530,000 for new yards at Richmond which include the buildings referred to.

The United States Rubber Company has purchased the Rubber Regenerating Company at Mishawaka, Ind. The latter plant employs 600 men.

Cincinnati

CINCINNATI, OHIO, March 26, 1917.

Quite a number of machine-tool builders are adding to their shop equipment, but plant extensions are not contemplated for the immediate future. In one or two instances lately firms have purchased machines from second-hand dealers in order to increase their output without delay. The domestic call for lathes is very good. Drilling machines are also in demand, and one comparatively large order from Russia was recently received. The lifting of freight embargoes by a number of railroads has relieved the situation considerably on both incoming and outbound shipments, but a number of finished machines are yet in warehouses that cannot be forwarded to destination. This is expected to clear up in a few days.

The mill and factory supply houses are able to make better deliveries on shop supplies, but report that price advances have not yet ceased. No local foundries have been compelled to close down due to a shortage of coke or pig iron. Small electric motors and generators, as well as electric drilling machines, are being ordered by domestic and foreign customers, but some difficulty is met in getting shipments through to customers in Europe. A few orders have been received lately from Australia.

The Wirthlin-Mann Company, Cincinnati, designing engineer and dealer in foundry equipment, has increased its capital stock from \$50,000 to \$150,000, to take care of its increasing business. The company is putting on the market a new conveyor and magnetic separator for reclaiming scrap iron from refuse foundry sand.

The Highland Body Mfg. Company, Cincinnati, has increased its capital stock from \$81,000 to \$150,000, and will add to its capacity at an early date.

The new plant of the American Tool Works Company, Cincinnati, is now under cover and work of removing machinery from its present building will be commenced shortly.

The R. K. LeBlond Machine Tool Company, Cincinnati, is making arrangements to move into its new plant in Hyde Park, and hopes to have part of it in operation before May 15.

The Ohio Knife Company, Cincinnati, is building an addition to its plant at Southside. Very little extra equipment will be required.

The Wells-Gray Company, Toronto, Ont., has the contract for additional buildings to the plant of the Peters Cartridge Company at King's Mills, Ohio, estimated to cost \$175,000. The Peters Cartridge Company's offices are in the First National Bank Building, Cincinnati.

The Stearns & Foster Company, Cincinnati, manufacturer of mattresses, has let contract for an addition to its plant at Lockland. No additional equipment will be required.

Additional information as to the plans of the Seybold Machine Company, Dayton, Ohio, whose capital stock was recently increased to \$1,000,000, indicate that the company's present output will be more than doubled.

The Swank Engineering Company, Dayton, Ohio, has been incorporated with \$10,000 capital stock. It will devote its time to road construction and not building manufacturing plants, as has been currently reported.

Work has been commenced on an addition to the plant of the Springfield Light, Heat & Power Company, Springfield, Ohio.

In addition to the proposed new building to be erected by the Elwood-Myers Company, Springfield, Ohio, the company has tentative plans under way for an eight-story factory of reinforced concrete.

The Elder & Hendry Foundry Company, Columbus, Ohio, is building an addition to its foundry on Yale Avenue.

The American Water Motor Company, Columbus, Ohio, has secured a site on Buttles Avenue on which it expects to erect a factory to manufacture water-motor washing machines.

The Hydraulic Press Mfg. Company, Mount Gilead, Ohio, has decided to rebuild its plant and not remove to Columbus, as was previously contemplated.

The Wapakoneta Machine Company, Wapakoneta, Ohio, maker of metal cutting knives and automobile accessories, is increasing its manufacturing facilities. Nothing is known as to its machinery requirements.

The Ironton Incandescent Light & Supply Company, Ironton, Ohio, has increased its capital stock from \$25,000 to

\$100,000, and is making arrangements for enlarging its factory. It manufactures a special heater.

The Mineral City Mfg. Company, Mineral City, Ohio, has been incorporated with \$25,000 capital stock by C. F. McBride and others, to manufacture valves. Nothing is yet known as to its manufacturing plans.

Marietta, Ohio, will soon ask for bids on a boiler and other extra equipment for the municipal lighting plant.

The Richards Mfg. Company, Marietta, maker of household specialties and children's vehicles, is making arrangements for doubling the capacity of its factory.

The Central South

LOUISVILLE, KY., March 26, 1917.

Tool equipment for garages is in brisk demand for the surrounding section. Coal and oil development requirements continue large. Considerable equipment will be required to replace plants damaged immediately across the Ohio River from Louisville where a tornado on March 23 caused heavy damage.

The Mengel Brothers Company, manufacturer of cigar boxes, Louisville, Ky., will add a fourth story, 100 x 150 ft., to its factory.

The C. C. Mengel & Brother Company, Louisville, Ky., is doubling the capacity of its sawmill and dimension stock plant, replacing a single band saw mill with a double band mill, etc.

The Kentucky Traction & Terminal Company, Lexington, Ky., has contracted with the Combs Lumber Company, Lexington, for construction preparatory to the installation of an additional 4000-kw. turbine, auxiliaries, condenser and switchboard, at a total cost of \$125,000.

Fire March 21 destroyed the ice manufacturing plant of R. W. Wilson, Auburn, Ky., with a loss of \$40,000.

J. W. Blackburn & Sons, Central City, Ky., will erect a garage, 40 x 80 ft., at a cost of \$5,000, and install complete equipment.

The factories of the Kaehler Furniture Company and the Hoosier Panel & Veneer Works, at New Albany, Ind., were wrecked and practically dismantled in the tornado which struck that city March 23. Estimates of extent of damage are not complete at this time.

The Chattanooga Boiler & Tank Company, Chattanooga, Tenn., has purchased the old Chattanooga Machinery Company's plant, which it will occupy after extensive improvements are made.

The Chattanooga Mfg. Company, Chattanooga, Tenn., box manufacturer, has plans for a factory containing 70,000 sq. ft. of floor space to replace that destroyed by fire.

The John G. Duncan Company, Knoxville, Tenn., is seeking jobber's cash price for 12-in. x 4 or 6-ft. old style engine lathe to be used for turning large wooden spokes.

St. Louis

ST. LOUIS, MO., March 26, 1917.

The call for machine tools continues to broaden with the individual demand confined mostly to one or two tools. The aggregate of purchases is large. The delivery period is again spreading. The general impression if war comes is that it will speed up practically all industries in this section and only interfere so far as labor may be reduced by the mobilization of the militia.

The Universal Egg Carrier Company, St. Louis, Mo., has been incorporated with a capital stock of \$50,000 by Howard A. Smith, John L. Lovett and others.

The Musick's Plating Works, St. Louis, Mo., has just closed a 10-year lease with the Lucas Estate for a one-story factory building to be erected at 915-919 Chestnut Street. The works has been located in the vicinity of Eighth and Market streets for the past 35 years and expects to move to its new building about May 15.

The Maryville Electric Light & Power Company, Maryville, Mo., will install one 350-kw. generator direct connected to a Corliss engine, and other equipment, for the extension of service to nearby towns.

The wood-working plant of the Rockwell Mfg. Company, Camden, Ark., was burned March 22 with a reported loss of \$300,000. It will be rebuilt. J. F. Judd, 3523 University Street, St. Louis, is president, and B. C. Rockwell, Camden, Ark., is manager.

The Coal District Power Company, Lawrence, Kan., Hugh Means, president, will enlarge the plants which it has acquired at Greenwood, Mansfield, Huntington and Hartford, Ark., and is in the market for about \$75,000 worth of electric generating and waterworks pumping equipment.

The Great American Refining Company, Claremore, Okla.,

J. Wise Brown, Tulsa, president, will equip a plant to manufacture gasoline and by-products from crude oil. It is capitalized at \$500,000.

Martin & Son, Meridian, Miss., will equip a wood-working plant requiring about \$4,000 worth of machine tools exclusive of boilers, engines, etc. W. P. Martin is manager.

Birmingham

BIRMINGHAM, ALA., March 26, 1917.

Wholesale machinery dealers find it difficult to meet the demand for engines, pumps, boilers and other apparatus, both steam and electric, for the many new coal mines that are opening up. Business is at a maximum with special effort being made to hurry deliveries.

The Southern Pipe & Foundry Company, Birmingham, has been incorporated by W. L. Stephenson, J. C. Hall and others.

The Export Railway Company, Tampa, Fla., will establish a plant to manufacture acid phosphate. The investment, it is reported, will amount to \$1,000,000.

The American Phosphate Company, controlled by the American Agricultural Company, 2 Rector Street, New York, plans development of phosphate deposits at Bloomingdale, Fla., an acid phosphate plant near Tampa, etc., the total cost to be about \$1,000,000.

Texas

AUSTIN, TEX., March 24, 1917.

The demand for electrical machinery and equipment for irrigation pumping plants is good.

The Salt River Valley Water Users' Association plans to construct a hydroelectric plant at Horse Shoe Bend on Salt River, about 20 miles below the Roosevelt dam, to develop about 10,000 hp. It also has in view the construction of a dam across the Verde River and the building of a system of irrigation canals with a view of reclaiming about 40,000 acres of land. About \$1,000,000 will be expended.

The Holly Sugar Corporation, Holly, Col., has purchased a site at Las Cruces, N. M., upon which it will build a beet sugar factory to cost about \$1,000,000.

The Phoenix Elevator, Sherman, has been incorporated with a capital stock of \$250,000. It will build a grain elevator. B. F. Smith is a stockholder.

The Hill County Cotton Oil Company, Hillsboro, will build a cotton seed oil mill to be electrically operated.

The Ezyroll Mattress Company, Clarksville, incorporated with a capital stock of \$10,000, will establish a plant. F. D. Hinds is a stockholder.

The Santa Helena Improvement Company will install an irrigation pumping plant on the Rio Grande and build a system of canals and ditches for irrigating about 16,000 acres of land at San Benito. The proposed improvements will cost about \$500,000.

The Humble Oil Company, which recently increased its capital stock from \$300,000 to \$4,000,000, will, it is stated, build an oil refinery at Houston. It will also enlarge its oil development operations.

California

LOS ANGELES, CAL., March 26, 1917.

The proposed plant of the Porcelain Products Company, Los Angeles, Cal., recently incorporated, to be erected at Torrance, will specialize in the manufacture of flush tanks, electrical insulators and flat ware. The initial plant is estimated to cost \$150,000. The company is allied with the Universal Sanitary Mfg. Company, New Castle, Pa., manufacturer of pottery and fire clay products. Charles J. Kirk is president of both companies. Dr. S. Trood will be general manager of the Los Angeles branch.

The Moreland Motor Truck Company, 1701 North Main Street, Los Angeles, Cal., has closed negotiations for the purchase of a site on San Fernando Road, Burbank, for the erection of a new plant.

The Paschall Tool Company, Long Beach, Cal., recently organized, has acquired property at the foot of Seventh Street and will establish a plant for the manufacture of a lathe attachment. James H. Paschall is president.

The Tidewater Southern Railroad, Modesto, Cal., is reported to be planning additions and improvements, including the electrification of its lines. The work is estimated to cost \$750,000. Byron A. Bearce is president.

The Santa Fé Railroad Company, San Bernardino, Cal., has awarded contracts for two additions to its local shops, to replace structures recently destroyed by fire, one-story, 32 x 140 ft., and 30 x 100 ft., respectively.

The Pacific Northwest

SEATTLE, WASH., March 20, 1917.

Orders for steel and wooden ships continue to pour into shipbuilding plants here, and practically every yard in the Northwest would be running to full capacity if equipment and stock were easily obtainable. As it is, most of the larger plants are running 24 hr. per day, although some shipyards are not employing their full quota of men. The car shortage has caused difficulty in obtaining necessary materials. Contracts recently awarded to Seattle shipbuilders give that city a total of 44 steel merchant ships now contracted for or under construction.

Reports show that the year 1916 was the busiest ever known in the locomotive and car industry on the Pacific coast, and will go down in railroad-construction annals as a year in which high prices and poor deliveries were the prevailing features. Railroads reaching this coast, including those timber companies and short lines operating railroads on the coast, ordered during the past year 149 locomotives. A great number of heavy engines were sold to logging companies. Freight cars ordered by Pacific coast roads in 1916 aggregated 20,885 in all classes.

The lumber market shows a stronger tendency, and if the car-shortage situation is adjusted shortly, the industry will markedly improve. Prices remain firm. Shingle capacity of the State has been curtailed fully 50 per cent, while lumber is curtailed about 33 per cent in production. Mills generally continue to refuse new orders, especially those grades of lumber which require to be shipped in closed box cars. There are now 17,423 carloads of unshipped transcontinental orders awaiting shipment.

A new firm has been organized in Tacoma, Wash., by W. C. Miller, secretary, Edward C. Hill, president, and W. J. Carr, treasurer, to take over an idle furniture plant in Custer, Wash., and put it into operation. The company is capitalized at \$100,000. The plant will be equipped throughout with new machinery and placed in operation this spring.

The Pacific Lead Products Company, Spokane, Wash., has taken over the plant built several years ago for the Western Lead Paint Company, and will install new equipment for the manufacture of arsenate of lead, an orchard spray. A. C. Johnson is president.

The A. G. Stevens Brick & Tile Company, Enterprise, Ore., plans to construct a manufacturing plant at Gladstone, Ore., to manufacture five different kinds of brick.

The Shoshone Timber Company, Minneapolis, Minn., has negotiated with G. A. Branson, St. Maries, Idaho, to log 40,000,000 ft. of timber. The contract will represent an estimated outlay of \$150,000.

Rasmussen & Co., paint and oil manufacturers, Portland, Ore., will build a \$60,000 factory and warehouse, six stories, 100 x 150 ft., of reinforced concrete, equipped throughout with new machinery. J. P. Rasmussen is president.

The Pacific Construction & Engineering Company, Seattle, has recently completed plans for a forge shop, 71 x 250 ft., a power house 29 x 37 ft., and an office 30 x 42 ft. The new improvements will cost \$20,000.

The Co-operative Livestock & Dairy Products Company, Butte, Mont., has been incorporated with capital of \$250,000, and plans to construct a cold-storage and refrigerating plant at Twin Bridges, near Butte. The officers of the company are Adolph Englehard, president; William Knopp, vice-president; M. E. Sherrill, secretary, and Albert Egan, treasurer.

The tin shop of the Portland Stove Works, Portland, Ore., was destroyed by fire recently.

W. J. Patterson, Aberdeen, is at the head of a project to construct shipyards in Aberdeen, Wash. Several contracts for vessels are held by the company.

The capital stock of the Western Shipbuilding Corporation, Securities Building, Seattle, Wash., is \$500,000, not \$100,000, as has been stated.

Canada

TORONTO, ONT., March 26, 1917.

It is reported that the Imperial Munitions Board, Ottawa, intends to establish a large aeroplane industry at Deseronto, Ont., which will be a duplicate of the plant being erected at Camp Borden, Ont., at a cost of \$3,000,000.

The Brompton Pulp & Paper Company, East Angus, Que., is to start work immediately on the erection of a concrete dam and power plant to cost \$750,000. J. O. C. Mignault, 17 Sanborn Street, is the engineer in charge.

The utilities commission, Springbank, Ont., proposes to spend \$20,000 on power development. The pumphouse will be rearranged and additional equipment installed, with a view to developing 1500 hp. E. V. Buchanan, City Hall, London, is manager for the commission.

Carman, Man., will be in the market for a 100-hp. boiler. A. Malcolmson is secretary.

W. H. Hutchison has taken over the Doty Machine Works, Goderich, Ont.

The Port Dover Creamery Company, Port Dover, Ont., is in the market for a 75-hp. horizontal steam engine. F. M. Pond is manager.

The sawmill owned by the Pearce Company, Ltd., Mor-mora, Ont., was destroyed by fire March 22, with a loss of \$25,000. F. S. Pearce is president.

The Huntley Mfg. Company, Silver Creek, N. Y., proposes to establish a manufacturing plant at Tillsonburg, Ont., for the manufacture of grain-cleaning, canning, peanut and coffee machinery, etc.

Mackinnon, Holmes & Co., Ltd., Sherbrooke, Que., has commenced the erection of a new plant to cost \$40,000 to replace the one destroyed by fire. F. A. Johnston is secretary and treasurer.

The Ford Tractor Company of Canada, Ltd., Toronto, has been incorporated with a capital stock of \$10,000,000. This company has acquired the rights of the Ford Tractor Company, Inc., including the patent rights within the Dominion for the Ford tractor. No indication is given as to when the company will start operations.

The Herbert Morris Crane & Hoist Company, Birmingham, England, has purchased seven acres at Niagara Falls, Ont., and will establish its Canadian branch there. Construction work will commence immediately. The company will manufacture traveling cranes, hoists, etc.

The sale of the plant of the Chatham Bridge Company, Chatham, Ont., to the Pittsburgh & Des Moines Steel Company has been indorsed by the shareholders, and it is expected that the deal will be finally closed within the next few days.

The Dickson Bridge Company, Campbellford, Ont., has commenced the erection of a new plant to replace the one recently destroyed by fire. A. H. McKeel is in charge.

V. O. Phillips & Sons, Kitchener, Ont., have started the erection of an addition to the plant of the Twin City Oil Company, Kitchener, for the manufacture of a gasoline pump.

The Dominion Thresher Company, Ltd., has taken over the plant of the Hamburg Thresher Company at New Hamburg, Ont.

The Richardson Grain Separator Company, Minneapolis, Minn., has purchased a site at Winnipeg, Man., and will erect a plant there.

Levis, Que., is contemplating the installation of a centrifugal pump with electric motor on one side and a steam-driven turbine on the other. C. C. Lessard, 147 Cote de la Montagne, Quebec, is the engineer.

Wilson Brothers, Collingwood, Ont., whose planing mill was destroyed by fire with a loss of \$100,000, will rebuild.

The Oshawa Interior Fittings Company, Oshawa, Ont., whose plant was recently destroyed by fire with a loss of \$75,000, is to rebuild. W. J. Trick is owner.

It is reported that the Quaker Oats Company, Chicago, Ill., plans to rebuild its plant at Peterboro, Ont., which was almost totally destroyed by fire Dec. 11, 1916, with a loss of about \$1,000,000. Much new machinery and equipment will be required. W. H. Dean is local superintendent.

Plans are now perfected for the organization of the St. John Shipbuilding Company, with a capital stock of \$1,000,000. The company will establish a shipbuilding plant at St. John, N. B. At the start it intends to turn out only wooden ships, but steel ones will be built later.

The Canadian Pacific Railway proposes to build a round-house, shops, etc., at Smelter Junction, B. C. S. G. Denman, Vancouver, B. C., is assistant purchasing agent.

The Northern Toys & Turning Company, Ltd., 703 Power Building, Montreal, will build a plant at Montreal to cost \$100,000.

The Standard Tractor Company, Regina, Sask., has secured a site on which a plant will be erected soon.

Plans have been prepared for a new foundry to be erected on Cherry Street, Toronto, for the Queen City Foundry Company at a cost of \$12,000.

The British Forgings, Ltd., Royal Bank Building, Toronto, has awarded contract for an addition to its plant to cost \$3,500.

The Volta Mfg. Company, Welland, Ont., will build an addition to its plant to cost \$3,000.

A. A. Scully, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by Albert A. Scully, Edward J. Ryan, and Gordon Waldron, 18 King West; Harold L. Scully, Parry Sound, Ont., and others, to manufacture and deal in railway and contractors' equipment.

The Commercial Sewing Machine Mfg. Company, Ltd.,

Toronto, has been incorporated with a capital stock of \$250,000 by Frank Regan, 112 Manning Chambers; Frank J. Hughes, Daniel P. Kelly and others.

The Interurban Motors, Ltd., St. Thomas, Ont., have been incorporated with a capital stock of \$100,000 by William H. Finch, Aylmer, Ont.; William H. Jolley, St. Thomas; John T. Webster and others, to manufacture automobiles, etc.

The National Shipbuilding Company, Ltd., Goderich, Ont., has been incorporated with a capital stock of \$100,000 by William H. Hutchinson, St. Catharines; Robert G. Stewart, Ernest A. Larmonth and others of Ottawa, to build ships, and carry on the business of iron founder, manufacturer of engines, machinery, etc.

The Canadian Electric & Gas Heater Company, Ltd., Montreal, has been incorporated with a capital stock of \$250,000 by Charles J. E. Charbonneau, James E. Coulin, Montreal; Philippe Morel, Maisonneuve, Quebec, and others.

The Champion Spark Plug Company of Canada, Ltd., Windsor, Ont., has been incorporated with a capital stock of \$100,000 by Robert A. Stranahan, Fordyce B. Caswell, both of Toledo, Ohio; Oscar E. Fleming, Windsor, Ont., and others.

The Porte Golf Machine Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$25,000 by A. Davenport, J. R. Higgins, J. W. Higgins and others.

The Canadian Weed Eradicator Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of \$300,000 by W. H. Morrison, W. C. Homenway, C. S. Stewart and others to manufacture implements, etc.

The Vancouver Engineering Works, Ltd., Vancouver, B. C., has been incorporated with a capital stock of \$1,000,000 to carry on a general machine shop and engineering business.

Government Purchases

WASHINGTON, D. C., March 26, 1917.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, schedule 858, for 2720 pneumatic riveting hammers and 2560 pneumatic scaling hammers.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, March 20 for supplies for the naval service as follows:

Schedule 757, Steam Engineering

Class 11, Mare Island—One sanding machine—Bid 3, \$728 and \$748; 119, \$991, \$847 and \$940; 134, \$1,015 and \$1,060; 141, \$900 and \$830.

Schedule 770, Ordnance

Class 41, Washington, D. C.—One vertical miller—Bid 14, \$2,740; 87, \$2,700; 119, \$3,298; 126, \$2,965; 158, \$2,493.

The following bids were received by the commissioners of the District of Columbia, Washington, March 20 for furnishing one sliding bed extension gap lathe: Bid 120, \$1,945, 120 working days; 10, \$1,944.75, 165 working days; 87, \$1,664 and \$2,145, 145 days.

The names of the bidders and the numbers under which they are designated in the above lists, are as follows:

Bid 3, American Woodworking Machinery Company; 10, Aumen Machinery Company; 14, Brown & Sharpe Mfg. Company; 87, Kemp Machinery Company; 119, Manning, Maxwell & Moore, Inc.; 120, Niles-Bement-Pond Company; 126, D. Nast Machinery Company; 134, Oliver Machinery Company; 141, H. H. Plummer & Co.; 158, Swind Machinery Company.

Production of Fuel Briquettes in 1916

The production of fuel briquettes in the United States in 1916 was 295,155 net tons, valued at \$1,445,662, an increase compared with 1915 of 73,618 tons, or 33 per cent, in quantity, and \$409,946, or 40 per cent, in value. The production in 1916 was the greatest recorded, exceeding that of 1914, the previous high record, by 44,520 tons. This increase, attributed by C. E. Leshner, of the United States Geological Survey, Department of the Interior, to the improvement in trade conditions arising from the unusual demand for coal and to a greater general appreciation of the value of briquettes for use as household fuel. In the last two years the product of many of the plants has been so much improved that it gives off less of the heavy, tarry smoke that domestic consumers had found so objectionable.

The Rowe Calk Company, Plantsville, Conn., announces that it has secured a large contract from the United States Government for automobile chains.

NEW TRADE PUBLICATIONS

Ball Bearings.—Hess-Bright Mfg. Company, Front Street and Erie Avenue, Philadelphia. Form No. 483-5B. Devoted to the use of ball bearings in machine tools. A brief account of the early forms of bearings is given and a discussion of the origin and use of the annular type is presented. A number of machine tools equipped with ball bearings are shown, the list including vertical and horizontal grinding, sensitive and electric drilling and buffing and grinding machines, boring mills, lathes, jib cranes, etc. In a number of cases diagrams showing the mounting of the bearings supplement the engravings of the machines.

Radial Brick Chimneys.—M. W. Kellogg Company, 90 West Street, New York City. Two booklets. The first, entitled "The Story of the Chimney," illustrates and describes the development of the chimney from the time of the cave man to the present day and points out the important place occupied by the chimney in ancient history. The other booklet, "The Building of a Modern Chimney," shows its development with a view to bringing out the vital problems involved in its construction and to pointing out that a chimney is really much more than just brick and mortar. In this pamphlet the various steps in the making of radial brick for chimneys are described, the text being supplemented by a number of engravings of different operations as well as views of partially completed and finished chimneys.

Portable Tools.—Independent Pneumatic Tool Company, Thor Building, Chicago, Ill. Catalog No. 10. Illustrates and describes a line of portable pneumatic tools and electric drilling machines. The descriptions are concise, yet complete, and are supplemented by numerous tables of the various sizes that can be supplied. A number of views of the tools in use are included.

Concrete Mixers.—T. L. Smith Company, 1125 Thirty-second Street, Milwaukee. Catalog No. 402. Illustrations and descriptive matter explain the operation of a complete line of concrete mixers and paving machines. Emphasis is laid upon the fact that the table of capacities is based on the new rating adopted by the National Association of Mixer Manufacturers, the machines being rated on their capacity in wet mixed concrete. The line includes mixers mounted on trucks with gasoline and steam engine drive and on wooden or steel skids. In connection with the descriptions of the various mixers, running heads emphasizing the different features appear at the tops of the pages. Mention is made of a line of concrete cars and all-steel elevators and a number of dimension and specification tables are included.

Portable Tying Machines.—New York Revolving Portable Elevator Company, 384 Garfield Avenue, Jersey City. Bulletin No. 50. Size, 4 x 9 in.; pages, 24. Describes and illustrates the Revolver which is a portable elevator or tying machine with a revolving base that can turn on its center like a railroad turntable. After a brief description of the use of the machine for piling cases, bales, rolls, barrels, hogsheds, etc., in storerooms and warehouses without any waste space, the various types of machines are illustrated and the construction is gone into at some length. A dimension diagram and table is included and mention is made of special machines and a line of lifting platform elevators.

Engine Lathe.—Master Machine Tool Company, 110 West Fortieth Street, New York City. Folder. Mentions the advantages of a 12-in. geared head rapid precision lathe among which are accuracy of product, speed and weight. All of these are briefly discussed and an engraving of the lathe which was illustrated in THE IRON AGE, Feb. 15, 1917, is included.

Electric Fans and Motors.—Sprague Electric Works of the General Electric Company, 527 West Thirty-fourth Street, New York City. Pamphlet No. B-3409 and bulletin No. 41,514. The first describes a line of electric fans of various types for use on direct and alternating current circuits. Illustrations of the several styles made are given and specification tables are included. The bulletin presents illustrations and descriptions of a single-phase motor for adjustable or constant speed. For the most part the engravings in the bulletin are views of actual installations.

Scales and Factory Trucks.—Standard Scale & Supply Company, 1631 Liberty Avenue, Pittsburgh. Folder No. A-220. Covers a line of scales that embraces all kinds of weighing devices and ranges from a small family beam outfit up to one designed for weighing motor trucks. The trucks shown include those of the ordinary hand type and four and six-wheeled ones for use in factories, warehouses, etc. A brief description of the different scales and trucks is given under the engravings.

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